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TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, [redacted] 1922

No. [redacted] 238

CONCRETE STEEL COMPANY, PETITIONER,

vs.

GEORGE E. VANDENBURG.

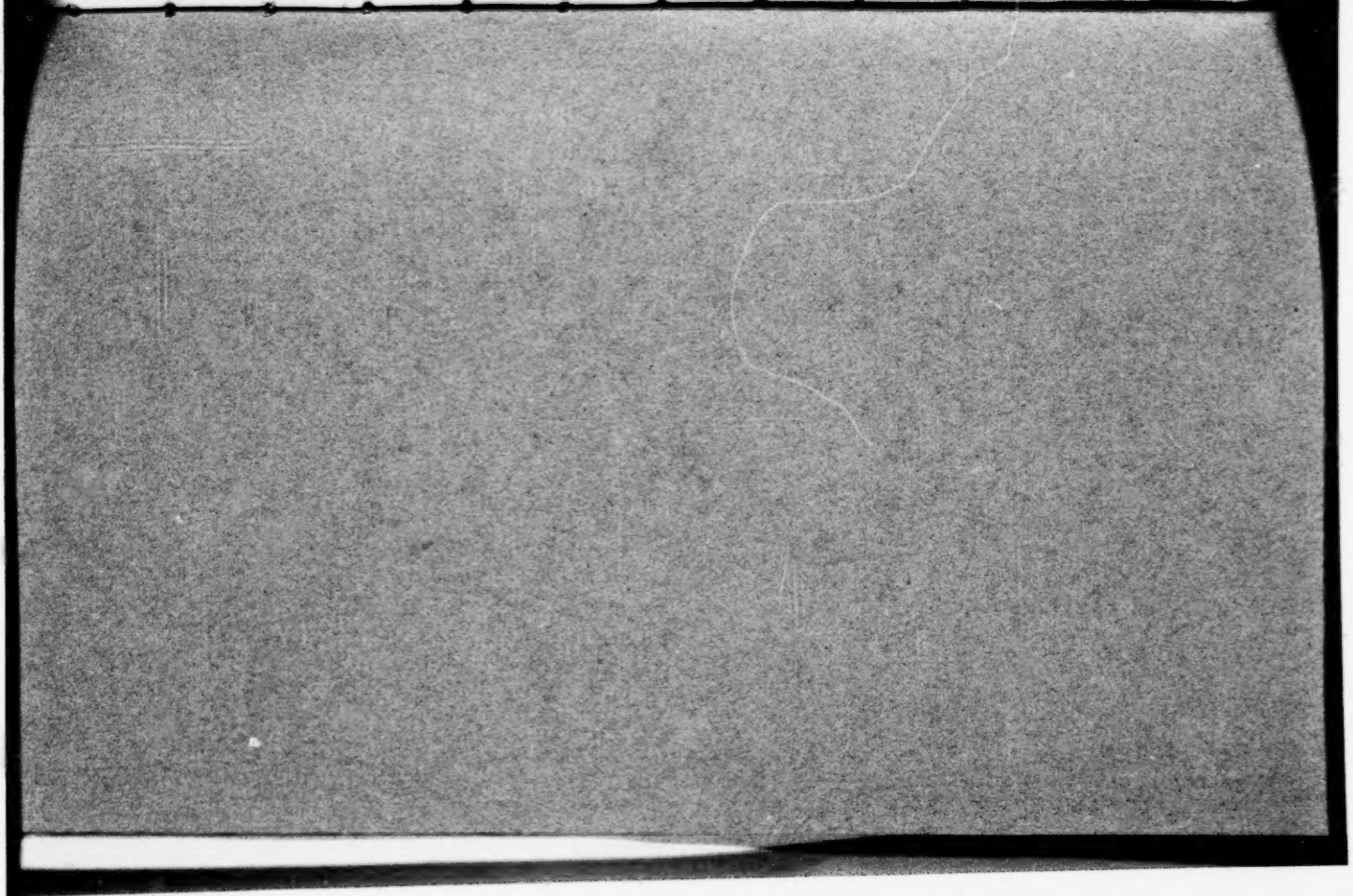
WRIT OF CERTIORARI TO THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK.

Circuit Court of appeals for the Second Circuit

PETITION FOR CERTIORARI FILED JANUARY 3, 1923.

CERTIORARI AND RETURN FILED FEBRUARY 11, 1923.

(28,629)



(28,629)

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1921.

No. 674.

CONCRETE STEEL COMPANY, PETITIONER,

vs.

GEORGE E. VANDENBURG.

ON WRIT OF CERTIORARI TO THE UNITED STATES ~~DISTRICT~~ Circuit COURT ~~FOR THE SOUTHERN DISTRICT OF NEW YORK~~ of Appeals for the Second Circuit

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IN THE

United States District Court,

FOR THE SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Complainant, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. No. 14-88.

2

Bill of Complaint

George E. Vandenburgh, a citizen of the United States, and a resident of the State of California, brings this his bill of complaint against the Concrete Steel Company, a corporation duly organized and existing under the laws of the State of Delaware, and having a place of business at Room 1,200, 42 Broadway, N. Y., in the State of New York, and for cause of action alleges and avers:

3

I.—That heretofore, to-wit, on and prior to May 9th, 1906, your orator was the original, first and sole inventor of a certain new and useful reinforcing bar particularly adapted for cement and concrete construction, more fully described in the reissue patent hereafter referred to and made a part hereof.

II.—That said invention was new and useful, not known or used by others in this country, and

not patented or described in any printed publication in this or any foreign country before the invention thereof by said George E. Vandenburgh, or more than two years prior to May, 1906, and not in public use or on sale in the United States for more than two years prior to May 9th, 1906, and not abandoned by your orator.

III.—That your orator did, on the aforesaid ninth day of May, 1906, duly and regularly make and file an application for patent on said invention in the United States Patent Office at Washington, D. C., praying the grant to him of a patent for said invention.

IV.—That thereafter upon due and regular proceedings had by the Patent Office in the matter of said Patent Application on the twenty-second day of January, 1907, letters patent number 841,741 were regularly granted and delivered by the United States Government to your orator, his heirs and assigns wherein and whereby there was secured to your orator his heirs and assigns for the full term of seventeen years from the 22d day of January, 1907, the sole and exclusive right to make, use and vend said invention throughout the United States of America and its territories.

V.—That said letters patent were issued in due form of law under the seal of the Patent Office of the United States, and were duly signed by the Commissioner of Patents, or by his Assistant acting for him, and prior to the grant thereof all proceedings were had which were then required

by the law to be taken prior to the grant of letters patent for new and useful inventions, and were thereafter delivered to your orator. 7

VI.—That thereafter it appeared to your orator that said letters patent were defective and insufficient by reason of the fact that your orator had claimed more than he had a right to claim as new, and by reason of the fact that the verbiage of the claims were defective in not precisely corresponding with the terms of the Specifications whereupon on, to-wit, July 1st, 1916, being 8 then sole owner of all right, title and interest in said patent, your orator prepared in accordance with law and filed an application with the Commissioner of Patents of the United States to have said Patent reissued; that thereafter due proceedings were had by the United States Patent Office, and in regular course said Patent was reissued and was delivered to your orator granting to him rights of the same effect and operation in law as if the same had been originally filed in such corrected form, and that the errors or mistakes in the original Patent arose by accident or inadvertence and without fraudulent or deceptive intention on the part of your orator. 9

VII.—That said reissued letters patent were granted in due form of law under the seal of the United States Patent Office, and were signed by the Acting Commissioner of Patents and bear date of August 15, 1916, under the number 14,182, and that all requisite proceedings were had prior to the reissue of said letters patent which are

required by law in such cases, and profert is hereby made of said reissued letters patent, or a certified copy thereof, for a more complete and full description of the invention covered thereby; and that your orator is now the sole owner of all right, title and interest in said reissued letters patent.

VIII.—Your orator further shows unto your Honors that said invention as covered and protected by said patent and said reissues thereof,
11 is of great and increasing value and utility and that the public generally has respected and acquiesced in the validity of said letters patent and the reissue thereof; that your orator has extensively practised said invention and has marked his concrete reinforcement with the word "Patented" and with the dates of said patent and of said reissue patent herein referred to; that your orator is desirous of preserving to himself all rights secured to him under said patent and the reissue thereof, and that he has a regular and established license fee for the use of said invention where he has permitted others to use it.
12

IX.—That notwithstanding the premises, but well knowing the same and for the purpose of injuring and damaging your orator in violation of his rights and without right or license from him, since the issuance of said letters patent, and since the reissuance thereof, within six years last past in the City of New York, State of New York, the Concrete Steel Company, the above named defendant has made and sold to divers persons and corporations, which persons and corporations are now using concrete reinforcing bars

containing and embodying the invention disclosed and claimed in the patent and reissued patent aforesaid; that defendant has made and sold several thousand tons of said concrete reinforcing and that said defendant notwithstanding notice by registered mail of such infringement threatens to continue the same, and does now continue such infringement of the rights secured to your orator as set forth and disclosed in the patent and reissue patent aforesaid.

X.—Your orator further shows unto your 14
Honors that he has notified said defendant by registered letter to desist from such infringement of his rights in the premises, but notwithstanding such notice the said defendant has utterly refused and neglected to discontinue the manufacture and sale of said concrete reinforcing and threatens to continue the making, using and selling of said concrete reinforcing bars embodying the invention herein referred to, and your orator further avers that such infringement of his rights by the defendant will work an irreparable damage, loss and injury to your orator unless restrained by the order of this Honorable Court. 15

XI.—Your orator further avers that by reason of such infringement defendant has made large gains and profits and your orator has suffered and sustained injuries and damages in a large amount, the total of which cannot be ascertained without the taking of an account and the amount of which is at present unknown to your orator.

XII.—That your orator has no plain, speedy or adequate remedy at law and can be relieved

only in a Court of Equity where matters of that nature are cognizable.

WHEREFORE YOUR ORATOR PRAYS:

That defendant be required to answer, an Oath thereupon being expressly waived, to the best and utmost of his knowledge fully, perfectly and truly, all and singular, the things charged in the aforesaid Bill of Complaint; that said defendant, his or their several agents, employees, servants,
17 attorneys, workmen and others acting for him, be enjoined and restrained from infringing said Letters Patent and the Reissue thereof; that said defendant be ordered to account for and pay over to your orator the gains and profits which he has made and realized, and in addition to said actual damages sustained by your Orator because of said infringement, that the amount thereof be increased three times as provided by the law in such cases made and provided because of the wilful nature of said infringement; that to ascertain the amount of such manufacture and sales a
18 master be appointed; and that plaintiff have his costs of this action.

May it please your Honors to grant unto your Orator a writ of injunction issued out of and under the seal of this Honorable Court, *pendente lite* and until final hearing, enjoining and restraining said defendant, his or their several agents, attorneys, employees, servants, workmen, and others acting for him, from making, selling or using, or causing to be made, sold or used, any concrete reinforcing bars with spirally disposed coils secured thereto as set forth in said patent No. 841,741 and reissue patent No. 14,182, and

that upon final hearing of this case that said injunction be made perpetual, and that your orator have such other further and additional relief as shall seem meet in equity and good conscience.

Wherefore may it please your Honors to grant unto your Orator a Writ of Subpoena *ad Respondendum* directed to the defendant Concrete Steel Company, commanding it or him by a day certain, and under a certain penalty, to be and appear in this Honorable Court and to then and 20 there answer this Bill of Complaint, and to abide by such order and decree as your Honors shall then make.

GEORGE E. VANDENBURGH,
Complainant.

CARLOS P. GRIFFIN,
Counsel for Complainant.

JAMES H. GRIFFIN,
Solicitor for Complainant.

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Answer

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88. Reissued Letters Patent 14,182.

23

To the Honorable the Judges of the United States District Court for the Southern District of New York:

The defendant, Concrete Steel Company, answering the bill of complaint herein, says:

1. Defendant has no knowledge, save from the bill of complaint, that George E. Vandenburgh, named in the bill of complaint, is a citizen of the United States or a resident of the State of California; and leaves the plaintiff to make such
24 proof thereof as he may deem advisable.

2. Defendant avers that it is a corporation duly organized and existing under the laws of the State of Delaware, and that it has a place of business at Room 1200, No. 42 Broadway, in the City, County and State of New York.

3. Defendant denies each and every of the allegations contained in paragraph 1 of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

4. Defendant denies each and every of the allegations contained in paragraph II of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

5. Defendant admits that one George E. Vandenburgh made an application for patent in the United States Patent Office at Washington, D. C., on the ninth day of May, 1906; but defendant denies each and every of the other allegations contained in paragraph III of said bill of complaint, and leaves the plaintiff to make such proof 26
thereof as he may deem advisable.

6. Defendant admits that on the 22d day of January, 1907, Letters Patent No. 851,741 were granted to one George E. Vandenburgh, his heirs and assigns, for the term of seventeen years from the 22d day of January, 1907; but defendant denies each and every of the other allegations contained in paragraph IV of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

7. Defendant admits that Letters Patent No. 27
841,741 were issued under the seal of the Patent Office of the United States, and were duly signed by the Commissioner of Patents, or by his assistant, acting for him; but defendant denies each and every of the other allegations contained in paragraph V of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

8. Defendant admits that on July 1, 1916, one George E. Vandenburgh filed an application with

28 *Answer.*

the Commissioner of Patents of the United States, to have said patent 841,741 reissued; but defendant denies each and every of the other allegations contained in paragraph VI of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

9. Defendant admits that on said application filed July 1, 1916, certain reissued Letters Patent were granted under the seal of the United States Patent Office, and were signed by the Acting
29 Commissioner of Patents, and bear date of August 15, 1916, under the number 14,182, but defendant denies each and every of the other allegations contained in paragraph VII of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

10. Defendant denies each and every of the allegations contained in paragraph VIII of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

30 11. Defendant admits that since the 22d day of January, 1907, and since the fifteenth day of August, 1916, within the last six years, in the City of Chicago, State of Illinois, and in the City of Youngstown, in the State of Ohio, defendant has made and sold to divers persons and corporations, which persons and corporations are now using, concrete reinforcing bars; and that defendant has made and sold several thousand tons of concrete reinforcing; and defendant admits that it was notified of the alleged infringement of Letters Patent 841,741 and Reissue 14,182; but

defendant denies that any concrete reinforcing bars or concrete reinforcing that it has made or sold, are an infringement of either of said Letters Patent; and defendant denies each and every of the other allegations contained in paragraph IX of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable; and defendant denies that it has committed, or threatened to commit, any wrongful or unlawful acts; and defendant denies that anything it has done or indicated its intention to do, has caused or will cause any damage to plaintiff.

12. Defendant admits that it was notified of the alleged infringement of Letters Patent 841,741 and Reissue 14,182; but defendant denies that any concrete reinforcing or concrete reinforcing bars that it has made, used or sold are an infringement of said Letters Patent; and defendant denies each and every of the other allegations contained in paragraph X of said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

13. Defendant denies that it has infringed either of said Letters Patent 841,741 or Reissue 14,182; and defendant denies each and every of the other allegations contained in paragraph XI of the said bill of complaint, and leaves the plaintiff to make such proof thereof as he may deem advisable.

14. Defendant admits that matters of the nature alleged in the bill of complaint are cognizable in a court of equity.

34 *Answer.*

15. Defendant further answering avers that said Reissue 14,182 is and always has been invalid and void, and of no force or effect, because of each and every of the matters hereinafter set forth, and defendant hereby gives notice to the plaintiff and his attorneys, counsel and solicitor, that on the trial of this cause, defendant will give in evidence, under the general issue plea, each and every of the following special matters:

35 (a) That for the purpose of deceiving the public the description and specification filed by the patentee in the Patent Office was made to contain less than the whole truth relative to his invention or discovery, or more than is necessary to produce the desired effect;

(b) That he had surreptitiously or unjustly obtained the patent for that which was in fact, invented by another, who was using reasonable diligence in adapting and perfecting the same;

(c) That it has been patented or described in some printed publication prior to his

36 supposed invention or discovery thereof, or more than two years prior to his application for a patent therefor;

(d) That he was not the original and first inventor or discoverer of any material and substantial part of the thing patented;

(e) That it had been in public use or on sale in this country for more than two years before his application for a patent, or had been abandoned to the public.

16. And defendant avers, that in view of the art existing prior to any alleged invention or discovery by said George E. Vandenburgh, there is

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nothing described, shown or claimed in said patent 14,182, involving any invention or discovery whatever; and that the thing described, shown and claimed in said patent 14,182 involves in its manufacture only the ordinary skill of the mechanic, and does not involve any invention whatsoever; and that in view of the art existing prior to any alleged invention or discovery by the said George E. Vandenburgh, the said patent 14,182, if valid at all, must be limited to the precise thing described and claimed in said patent, and as so limited, nothing made, used or sold by this 38
defendant is embraced within the claimed subject-matter of said patent; and that prior to any supposed invention or discovery by the said George E. Vandenburgh, the thing patented by said patent 14,182 and all material and substantial parts thereof, had, in the United States, been invented by, and had been known to, others.

17. And defendant avers that claims 1 and 2 of said reissued Letters Patent are broader than any claims in said original Letters Patent, and also broader than the alleged invention disclosed 39
in said original Letters Patent; that is to say, claims 1 and 2 of said reissued Letters Patent define and include a structure or structures which were not defined or included in any claims or in the description or drawings of said original Letters Patent; and said reissued Letters Patent, and particularly claims 1 and 2 thereof, are therefore void and without effect in law.

18. And defendant believes and therefore avers that long prior to July 1, 1916, the date of application for said reissued Letters Patent, plain-

tiff was aware of the acts of defendant now complained of, but delayed to apply for a reissue; and on account of said delay and plaintiff's laches, said reissued Letters Patent, and particularly claims 1 and 2 thereof, are void and of no effect in law.

19. And defendant avers that during the period between the issuance of said original Letters Patent, and the filing of the application for said reissued Letters Patent, it had in good faith built
41 up and extended its business in respect of the acts complained of, which on account of plaintiff's delay and laches in applying for said reissue, make it now most inequitable and unjust and in derogation of defendant's rights, that said reissued Letters Patent should now be asserted against it.

20. All of which foregoing statements and defenses this defendant is willing and ready to aver, maintain and prove as this Honorable Court may direct, and without admitting as true any of
42 the matters charged and alleged in said bill of complaint not herein well and sufficient answered, traversed and avoided or denied, this defendant prays to be hence dismissed with its reasonable costs and charges in its behalf most wrongfully sustained.

CONCRETE STEEL COMPANY,
By LUCIUS E. VARNEY,
Its Solicitor,
149 Broadway,
New York, N. Y.

EMERY, BOOTH, JANNEY & VARNEY,
DELOS G. HAYNES,
Of Counsel for Defendant.

43

Minutes of the Trial

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88.

44

New York, N. Y.,

Friday, May 10th, 1918.

Before:—HON. CHARLES M. HOUGH, *Circuit Judge*, holding the District Court for the Southern District of New York.

APPEARANCES:

CARLOS P. GRIFFIN, ESQ., and JAMES H. GRIFFIN, ESQ., for Plaintiff.

LUCIUS E. VARNEY, ESQ., for Defendant. 45

Mr. Griffin: I offer in evidence the original patent in suit.

Marked Plaintiff's Exhibit 1.

Also the re-issue patent.

Marked Plaintiff's Exhibit 2.

The Court: Let it be noted that the suit is based on claims 1, 2, 3 and 5.

Mr. Griffin: I offer in evidence defendant's device.

Marked Plaintiff's Exhibit 3.

I offer in evidence excerpts from the testimony

46 *Minutes of the Trial.*

in the Pittsburgh suit tried before Judge Orr but not yet decided.

Marked Plaintiff's Exhibit 4.

I offer in evidence defendant's catalogue, page 6.

Marked Plaintiff's Exhibit 5.

I offer in evidence defendant's device in suit in the case of Vandenburgh against Electric Welding Co.

Marked Plaintiff's Exhibit 6.

I offer in evidence a circular of plaintiff's li-
47 censee.

Marked Plaintiff's Exhibit 7.

Plaintiff's *prima facie* proofs closed.

DEFENDANT'S PROOFS.

Mr. Varney: I offer in evidence book of prior art patents.

Marked Defendant's Exhibit A.

I offer in evidence the file wrapper of the original patent.

Marked Defendant's Exhibit B.
48

I offer in evidence the file wrapper of the reissue patent in suit.

Marked Defendant's Exhibit C.

I offer in evidence a stipulation.

Marked Defendant's Exhibit D.

Testimony Closed.

49

Plaintiff's Exhibit No. 4

Excerpts from Testimony in the Case of

Vandenburgh v. *Electric Welding Co.*

(Pittsburgh Suit tried before Judge Orr, but not yet decided.)

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

50

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88. Reissued Letters Patent 14,182.

EXCERPTS FROM TESTIMONY

In the case of

VANDENBURGH *v.* ELECTRIC WELDING CO.

(Pittsburg Suit tried before Judge Orr, but not yet decided.) 51

Stipulated into Case at Bar.

Witnesses.

Vandenburgh ..... pp. 18
Cummings 25
Kahn 28
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Thayer 35
Chester 41

52 *Plaintiff's Exhibit No. 4.*

Testimony of Vandenburgh given in

VANDENBURGH
v.
ELECTRIC WELDING COMPANY,

In the United States District Court
for the Western District of Pennsylvania.

PRIMA FACIE PROOFS

53 GEORGE E. VANDENBURGH testified as follows:

Q. 1. Give your age and place of residence? A. My age is fifty-four; my residence is San Francisco.

Q. 2. Where are you staying at the present time? A. In Washington, D. C., 1803 Oregon Avenue.

Q. 3. Are you the George E. Vandenburgh who obtained U. S. Letters Patent 841,741, January 22, 1907? A. I am.

Q. 4. Will you state whether or not you made your invention prior to May 9, 1906? A. My first models, the first working out of that, was in the
54 fore part of February, 1903.

Q. 5. Will you state whether or not you regularly made and filed, on the 9th day of May, 1906, an application for patent on said invention, in United States Patent Office? A. I made application on May 9, 1906.

Q. 6. And was the patent duly and regularly issued upon said application? A. The patent was duly issued and delivered to me at San Francisco, January 22, 1907.

Q. 7. Did you or not, on or about July 1, 1916, make application to have said patent re-issued? A. I did.

Plaintiff's Exhibit No. 4. 55

Q. 8. For what reason did you make said re-issue application? A. Why, there were several mistakes in the wording of some of the claims. And one claim was so broad that it called for any kind of a fastening; whereas, I claimed that I invented a spur or integral fastening; and I wanted to limit it to my invention and not include the other. And one word was "end" instead of "edge".

Q. 9. Will you state whether or not such errors and inaccuracies were intentional or unintentional upon your part? A. They were unintentional upon my part. 56

Q. 10. Is the construction disclosed in the patent and re-issue of the patent of much or little value in the construction of concrete buildings? A. It is of great value in the construction of concrete.

Q. 11. You have said that the construction of this patent has proved of great value. How do you know that? A. Because it is adopted by all the large companies throughout this country; in the principle buildings going up through the country, they are using reinforced concrete. It is used in bridges and warehouses. All kinds of construction they are putting up, they are using this tie. 57

Q. 13. Have you yourself put it into use? A. No, sir.

Q. 14. You never put it into use? A. No, sir.

Q. 15 Anybody representing you put it into use? A. No, sir.

Q. 16. Any licensee? A. Yes, sir.

Q. 17. And who is the licensee? A. The Concrete Steel Products of Chicago, I have a license to them.

58 *Plaintiff's Exhibit No. 4.*

Q. 18. When did that company begin to use what you say is the construction under the patent under your license, or under consent from you? A. Well, I can't say when they commenced to use those, but it was licensed last year.

Q. 19. But they had been using it before? A. Yes, sir.

Q. 20. And without your consent before that time? A. Yes, sir.

Q. 21. And you threatened them with a suit for infringement last year? A. Yes, sir.

59 Q. 22. And as the result of that, they took out a license? A. They settled and took out a license, yes.

Q. 23. You don't know when they began using it? A. No, sir. I have the amount they used.

Q. 24. The suit that you threatened against the Concrete Steel Products Company was in California, was it not? A. Yes, sir.

Q. 25. They had put up a building there? A. Yes, sir.

Q. 26. And the Concrete Steel Products Company thought it would be cheaper to settle with

60 you than fight that suit out in California?

Objected to by counsel for plaintiff as not proper cross-examination.

Objection sustained:

Mr. Winter:

Q. 27. Outside of the products which the Concrete Steel Products Company has made during the last year, has anyone else taken out a license under your patent? A. No, sir.

Q. 28 No one else has paid you any royalty? A. No, sir.

Plaintiff's Exhibit No. 4. 61

Q. 29. You have said that one of the reasons for re-issuing your patent was that some of the claims stated that the convolutions were rigidly fastened to the bar. When did you find out that that defect exised in your original patent? A. I found out several years ago; but I never have taken it up in a place where it should be taken up and go ahead with it.

Q. 30. What do you mean by several years ago? Does that mean two or three? A. Well, I first made a study of it trying to get it on the market after the earthquake in San Francisco I went 62
to Washington, D. C., and got there on the 21st of July, 1906, right after the earthquake. The final patent papers were delivered to me on the 7th of January.

Q. 31. And then at that time you discovered that the claims had in them the word "rigidly"? A. Not at that time—well, no.

Q. 32. When did you discover that? A. In 1909, along about that time.

Q. 33 You then discovered that they had in them the word "rigidly"? A. Yes, I got that from a concrete engineer in looking them over. 63

Q. 34. What has been your experience in concrete construction? A. Well, I have had quite a bit of experience in it, considerable, and I have been on buildings having charge of other branches of the construction, where a great deal of concrete and reinforcing has been used. I have had charge of putting it in in Philadelphia and in Washington, D. C., and in San Francisco. I have put in the Kahn system.

Q. 35. Do you or do you not understand the mechanical theory of concrete reinforcement? A. I do understand mechanical theory as far as a practical man, not as an engineer.

64 *Plaintiff's Exhibit No. 4.*

Q. 36. Have you ever studied the subject outside of your practical work? A. No, I have never studied it to any great extent. I have read some books on it, but my reading was quite limited.

Q. 37. What was your financial and physical condition during the year following the grant of your original patent? A. Well, my health was very poor at the time. I had been in Florida for my health, and I came back from Florida and went home. Then I went back to Philadelphia,
65 and I came back from Florida and I made my home in Washington, D. C., with a friend of mine, B. Blethyn, at 1803 Oregon Avenue.

Q. 38. But in the time following the grant of your patent, where did you go and what was your financial and physical condition in those years? A. Well, I was sick a great deal; and I had several falls; I have had six falls in my lifetime and I now wear a bandage. And I have lost a great deal of money. I was robbed in Washington just before I went to Florida. And with my sick spells and my financial troubles I wasn't prepared to push my patent.

66 Q. 39. In making your original patent application, did you have any intention of defrauding anyone or deceiving anyone in making the disclosure of your specification? A. I had not.

Q. 40. When did you first make the invention disclosed in your original patent application? A. In February, 1903.

Q. 41. Where were you then living? A. I was living at 1803 Oregon Avenue, North, Washington, D. C. I made my home with B. Blethyn.

Q. 42. Did you make any embodiment or ex-

pression of the invention at the time in any way? A. Did I make any model, or anything of a description?

Q. 43. Did you make a model? A. I did make a model at that time. I made several models.

Q. 44. How many models did you make? A. I think there were five or six, all told, made in different forms; worked them out.

Q. 45. Will you examine the original patent and drawings and tell me whether the models made were similar to or different from any of the drawings shown in that patent? A. Well, 68 they were similar to Figure 3 and Figure 4 and Figure 6.

Q. 46. What became of those models? A. They were destroyed last year in a fire in Washington, D. C.

Q. 47. Where were they? A. They were in existence up to last year, where I had them stored there in Washington.

Q. 48. In whose possession were they? A. B. Blethyn's room, and he had a fire and destroyed them. I had all my photographs stored there.

Q. 49. At the time you made these models, will 69 you state whether or not they were shown to any one? A. They were shown to Mr. Blethyn. He saw it while I was experimenting on them, making them and working them out.

Q. 50. When was this? A. In February, 1903. And I made them in his shop between Twelfth and Thirteenth Street off from G.

Q. 51. Did you make any drawings of the invention at that time or not? A. Well, I always sketch up rough workings with a pencil, on a piece of paper of what I am working on.

70 *Plaintiff's Exhibit No. 4.*

Q. 52. Do you know what became of those drawings? A. Oh, I never keep nothing like that. I never keep no file of nothing. I am moving around from one city to another in building, and I never keep nothing like that.

Q. 53. Who did you first consult with respect to the re-issuance of this patent? A. I first consulted Mr. Griffin in the early part of last year, in San Francisco, in 1916. That was on my return from Sacramento, where I had been working on buildings; and I returned from Sacra-
71 mento to San Francisco, and I dropped in to see Mr. Griffin on the subject.

Q. 54. What was the reason that you did not apply for a patent immediately after the invention? A. From 1903 to 1906, I have told you what my health was; my health was very poor, and I was out of work, and I had to help my mother a good deal, who was sick; and then I got married and I was to a good deal of expense in going to housekeeping; and then my mother died and I had to go on and bury her. I was put to all the expense of the funeral and doctors'
72 bills and everything. And I had to help my wife's mother all the time. And, altogether, I had no money to put into patents. And the concrete was merely getting on them. It hadn't gotten far enough advanced that anybody would take and put any money into it.

Plaintiff's Exhibit No. 4. 73

EXCERPTS FROM DEFENDANT'S PROOFS

ROBERT A. CUMMINGS testified as follows (on behalf of Defendant):

Q. 1. What is your connection with the Electric Welding Company? A. President.

Q. 2. Did you ever do any investigation work with regard to the best way of taking care of stresses and strains in reinforced concrete work? A. Yes.

Q. 3. About when did you do that? A. The 74
study of reinforced concrete occupied my attention from 1893 continuosly to the present time. And the work of development has been practically continuous. I was more actively identified with actual testing on large structures in 1902, '3 and '4. Then I actually built the structurers and tested them. And I conducted a series of investigations with Prof. Turmeaure of the University of Wisconsin at Madison. The work was done at Pittsburg and vicinity.

Q. 4. To what extent did you at that time familiarize yourself with the technical literature 75
on this subject? A. I read everything that was printed in England and a good deal in this country.

Q. 5. I show you copies of four U. S. patents numbered, respectively, 764,883, dated July 12, 1904, for Metal and Concrete Column; 815,409, dated March 20, 1906, Concrete and Metal Structure; 822,587 of January 5, 1906, for Metal Reinforced Column; and 828,931 of August 21, 1906, for Concrete Column and the like. Are you the Robert A. Cummings, the patentee of these patents? A. Yes.

Q. 6. With reference to the various column re-

76 *Plaintiff's Exhibit No. 4.*

inforcements of your own design which you testified to, using independent hoops or bands, would these collapse in the sense that Mr. Vandenburg was referring to this morning? A. They do not collapse.

Q. 7. How does the cost of flat hoop reinforcement compare with the reinforcement of smaller size and spacing, using continuous spirals? A. The method that I effected was more expensive. We could not compete with the spiral continuous winding.

77 Q. 8. Do you know when in your work you used a continuous spiral for column reinforcement? A. I do not recall the exact date. But in my work, I believe, it must have been in the neighborhood of 1907 and 1908, along in that neighborhood somewhere. I do not remember the exact dates. I remember using it for some piles —some concrete piles that I drove at Chester, Pa. I drove those piles at Chester during the year, 1907.

Q. 9. Did you use longitudinal rods in these piles? A. Yes.

78 Q. 10. How were the rods and spirals fastened together, if at all? A. They were attached by the spacing bars that I have spogen about and also by wire.

Q. 11. When did the Electric Welding Company first manufacture the column reinforcement consisting of a spiral with two oppositely disposed vertical bars, such as shown in Plaintiff's Exhibit No. 1? A. Some time during the year 1911.

Q. 12. Mr. Cummings, out of the four patents presented by you and offered in evidence as your own patents, I understand none of them in

any way discloses anything at all with respect to spiral reinforcing. A. None whatever.

Q. 13. When you were using a series of hoops, you must have welded or riveted the joint for each hoop, must you not? A. Yes.

Q. 14. This would make an enormous number of joints in a good-sized building, would it not? A. Yes.

Q. 15. In the same building, if spirals were used in place of hoops, there would be only a few joints and those few would be easily made, would they not? A. Yes. 80

Q. 16. Then this would be an advantage in that form of construction? A. Yes.

Q. 17. A practical advantage or a commercial advantage, of great commercial advantage in fact? A. Yes, of great commercial advantage.

Q. 18. The possibility of collapsing the spirals is of considerable advantage in shipping, is it not? A. In shipping, yes.

Q. 19. And that is still a further advantage? A. No, sir, that is the only advantage they have, otherwise, they are a disadvantage.

Q. 20. Do you mean to say that the advantage you told us about the joint has now disappeared? 81
A. No, sir, not necessarily. That is incidental, just like collapsing. The other is not incidental.

Q. 21. In other words, there is an advantage in only having a few joints? A. Collapsibility is incidental to that type of construction.

Q. 22. Is it not also true that as a manufacturing proposition, it is much easier to make a single long spiral than a series of rings? A. Yes.

82 *Plaintiff's Exhibit No. 4.*

Q. 23. Is it not also true that it is easier to assemble the spiral unit than a unit made of a series of rings? A. No, you have the same number to put down in each case.

Q. 24. But would it not be more convenient to put up a bundle of longitudinals than to pick up a number of separate rings? A. We have not found it so.

Q. 25. Will you tell me why you abandoned the use of rings and adopted the spirals? A. Because of the joint.

83 Q. 26. Then there is a gain by that change? A. Yes, a manufacturing gain.

Q. 27. What experience had you, or your own knowledge, of spirals with integral fastenings to longitudinals in use prior to 1907 and 1908? A. No practical experience, except what I obtained from books.

Q. 28. And prior to that time, contractors used wires to secure the spirals to longitudinals? A. As far as I know, they did, yes.

JULIUS KAHN, testified as follows (on behalf of
84 Defendant):

Q. 1. What has been your experience as a concrete engineer? A. I graduated from the University of Michigan in 1896 and began the practice of reinforced concrete in 1902. In 1903, I organized the Trussed Concrete Steel Company of Michigan, of which I was elected the President, and have been connected with it since that time. The work of our own company consists of the designing of reinforced concrete structures and the furnishing of reinforcement for such buildings. During the years 1903 to 1907, we were contractors for reinforced concrete build-

ings. During all of that time we probably designed many thousand of buildings.

Q. 2. Has the Trussed Concrete Steel Company ever manufactured and sold column reinforcements? A. To a very large extent, running into thousands of tons.

Q. 3. When did you begin to manufacture and sell column reinforcements of the hooped type? A. My first authentic case, where I can place the column would be 1907.

Q. 4. In this particular case, do you know how the spirals were secured to the longitudinals? 86
A. They were wired to them.

Q. 5. When did the Trussed Concrete Steel Company begin to use, if ever, the integral connection between the longitudinals and spirals? A. I would say in 1907.

Q. 6. How do you fix that date? A. Through a circular issued in 1907 and bearing date December 17, 1907.

Q. 7. When did you first begin to use round metal spirals? A. The circular indicates the round as well as the flat, if you will read the joint members used for the column hooping directly above the picture. It says ½ by ¼ inch 87
flats as well as No. O wire.

Q. 8. About what is the diameter of No. O wire? A. About a quarter of an inch.

Q. 9. Were these reinforcements collapsible? A. They were.

Q. 10. When did you first learn of collapsible column hooping of this general type consisting of spirals connected to longitudinal members? A. As far as I can remember that we ever made this hooping we collapsed it for shipment.

Q. 11. About when was that? A. The earliest I can trace it back would be 1907. That would be the date of that circular.

88 *Plaintiff's Exhibit No. 4.*

Q. 12. Was anybody else making that at that time? A. Yes, they were used and sold quite generally by the Smith Iron & Wire Works of Chicago. I don't remember exactly when the American people put their column hooping into general circulation, but I think it was about that time.

Q. 13. Was the use of spiral hooping embodying longitudinal members, having integral fingers to hold the spirals into the kerfs, a matter of common knowledge among engineers at that
89 time? A. It was, and was used in all material shipped by the Smith Iron & Wire Works.

Q. 14. How do you know that the Smith was shipping them? A. Met them in competition.

Q. 15. When, relative to your first work? A. I would not be too sure about that answer—I think it was about 1907 or 1908.

Cross-examination:

xQ. 16. Mr. Kahn, you are very much interested in this case in assisting to defeat this pat-
90 ent and re-issue, as president of a company which is being sued by this plaintiff, and you have expressed very decided opinions adverse to this patent and its re-issue, have you not? A. Yes, sir.

xQ. 17. How much, roughly, of spiral reinforcings with spacing bars and integral means for securing the spirals thereto has your company made within the last six years?

(Question objected to and not answered.)

xQ. 18. You make spirals of this type with longitudinal reinforceing bars yourself, do you not? A. We do.

xQ. 19. And you find considerable advantage

in the use of such reinforcing? A. I think I made a mistake in my earlier answer. We don't make spirals with such bars to be used as reinforcing bars. And we do not make the construction shown in the Vandenburg patent. Does that answer your question?

xQ. 20. No ,sir, it doesn't? A. Then, I do not correctly understand it. I will tell you what we do make, is that what you wish to know?

xQ. 21. Very good. A. We manufacture column hooping consisting of spiral coils held together with spacing bars, which spacing bars have 92 notches therein for receiving the coils, the whole making a cage wherein the spirals are as nearly at right angles to the main bar as possible; wherein the bars hold the spirals at the proper distance apart, and these are not intended as reinforcement, the reinforcement consisting entirely of the spiral, which acts as a pipe around the concrete mass.

xQ.22. Is it not a fact that these spirals are held in these notches that you have spoken of by means integral with the longitudinal spacing bars? A. Yes.

xQ. 23. And do you mean to sit there and tell 93 me that you can put three-quarter inch steel longitudinals into another structure and not reinforce it in the manner you have just mentioned? A. We do not use the three-quarter inch steel spacing bars.

xQ. 24. What kind do you use? A. We use a little T, which has an area equivalent, I would say, to about three-eighths of an inch bar.

xQ. 25. Is it not a fact that in the San Diego job you used one and one-quarter inch bars? A. I don't remember what job you are talking about.

94 *Plaintiff's Exhibit No. 4.*

xQ. 26. The San Diego large bridge? A. Yes, I do remember. You mean in the Exposition.

xQ. 27. Yes. A. I have some samples of the bars we used there right here.

xQ. 28. And do you mean to say that when these spacing bars are put in a concrete construction, they don't reinforce it? A. They are not intended to reinforce it.

xQ. 29. Never mind that, just answer my question. A. We do not use them in our calculations—

95 xQ. 30. That is not the question. A. They might, by accident, lend some reinforcement. They are intended as spacers and not reinforcers.

xQ. 31. They do actually reinforce the concrete? A. Yes, I suppose, to some slight extent.

xQ. 32. Will you examine the patent No. 992,970 to McClure, of May 23, 1911, and examine Figure 4, and tell me, whether or not the reason for placing these two bars at opposite ends of the spiral and not contracting with each other in pairs is for the purpose of providing for its collapsibility? A. Yes, it is for that purpose in that

96 case.

Rebuttal

Benjamin Blethyn (on behalf of plaintiff), testified as follows:

Q 1. What is your age and place of residence? A. My age is fifty-five. My residence, 1803 Oregon Avenue, Washington, D. C.

Q 2. What is your occupation? A. Contractor and builder.

Q 3. How long have you been engaged in contracting? A. About thirty years.

Q. 4. What kind of contracting? A. General; all kinds of building construction.

Q. 5. Did you ever make any reinforced concrete building? A. Oh, yes.

Q. 6. How many? A. Several. About eight or ten different buildings, some large, some small.

Q. 7. When did you first know Mr. Vandenburgh? A. About twenty-five years ago.

Q. 8. Do you know where he was living in February, 1906? A. Yes; he was living in my house.

Q. 9. Did you ever know that he had a patent on a reinforcing for concrete? A. I saw him 98 working it out, yes, sir.

Q. 10. When? A. In 1903.

Q. 11. What time in 1903? A. The first part of it; about January or February; I am not certain of the exact date; I think it was in February.

Q 12. What did he do actually? A. First of all, he made a model of it out of wood with wire reinforcing in it. He made it out of wood first, and he got it to suit him, and then he made it out of steel.

Q. 13. How many models did he make, do you know? A. Oh, I seen several around there, prob- 99 ably four or five different kinds.

Q. 14. When? A. In 1903.

Q. 15. Were there four or five of these models in 1903? A. Yes, sir.

Q. 16. Do you know where those models are at the present time? A. Yes; I know where they've gone to now. But they were in my house up to November of last year, and I had a big fire in my cellar, and all the models and all his photo-

100 *Plaintiff's Exhibit No. 4.*

graphs and several other things were in my cellar —I had considerable lumber in there, and the Fire Marshal ordered everything cleared out.

Q. 17. How do you fix the time at which these models were made? A. During that time they were re-modeling a building next door to my shop, at 72 Thirteenth Street—I have been there eleven years, I think; and the owner of the building sent for the insurance people to examine the building; and they found this carpenter shop on the first floor, and the next day we got notice to
101 cancel our insurance. They didn't know there was a carpenter shop there; and I got notice to move. So I was obliged to go back to the Builders' Exchange in an alley. I couldn't get a place for a carpenter shop on a main street, on account of the insurance.

Q. 18. Is that the way you fix the date? A. Yes, sir.

Q. 19. Are you familiar with drawings? A. Yes, sir.

Q. 20. I hand you a copy of the Vandenburgh patent, 841,741, dated January 22, 1907, and ask
102 you if you understand the construction delineated there? A. Yes. I can recognize Figure 1, Figure 4, and Figure 6 very clear.

Q. 21. Do you know whether the models that you saw at that time were the same as or different from the constructions that are delineated upon that drawing? A. They are as near as I possibly can recall—probably a little more crude than usual, but they were just about the same.

Q. 22. And what figures do you refer to? A. Figures 1, 4 and 6. In fact, I can recognize them all, as far as that goes.

Q. 23. What is your experience in the construc-

tion of concrete buildings and concrete of all kinds? A. Well, I haven't had such a great deal of experience in concrete construction myself, but I have had a good deal of experience in buildings. My principal work is re-modeling business houses, but I manufacture and have done a good deal of concrete work. In one building, I had a contract for $65,000, the Bristol School.

Q. 24. Were these girder columns reinforced or plain? A. Reinforced.

Q. 25. Who designed these columns? A. I did.

Q. 26. Do you not understand the designing 104
of reinforced concrete? A. No, not as a practical engineer. As far as building goes, I think I do, as much as anybody else.

Q. 27. As a practical builder, do you consider that you could take the reinforcing shown there and produce satisfactory buildings? A. Oh, yes; I don't see why not.

Prof. Horace R. Thayer (on behalf of plaintiff) testified as follows:

105

Q. 1. What is your age, and where is your place of residence? A. My age is forty-four; my residence is Pittsburgh.

Q. 2. What is your occupation? A. Civil engineer.

Q. 3. What line of civil engineering do you follow? A. Structural engineering. I am assistant professor of designs at the Carnegie Institute of Technology, and I have done considerable outside work.

106 *Plaintiff's Exhibit No. 4.*

Q. 4. How much designing for concrete buildings have you done? A. I have done some. My first design in concrete work was, I think, about 1907. I have done some since then.

Q. 5. And are you familiar with that art? A. Yes. I think my first connection of any kind with reinforced concrete work was about 1903. At that time, concrete was just beginning to be used, and I had to teach and look it up. I was associated with Prof. Merriman, at that time, a well-known expert in cement. He was an ex-
107 pert on this matter, and he took a very active interest in it, and he discussed the matter, and I had the pleasure of reading his manuscripts. We had many discussions regarding the action of reinforced concrete.

Q. 6. Have you written anything on the subject of reinforced concrete? A. I have published a lecture on "Failures of Masonary" that took up some things in connection with reinforced concrete. I have presented an article before the Engineers' Club of Baltimore on reinforced concrete arches. And I have a partly written article on
108 the subject. That's all I recollect.

Q. 7. Are you familiar or not with drawings? A. Yes.

Q. 8. I hand you a copy of the Vandenburgh patent, 841,741, dated January 22, 1907, and ask you whether, in your judgment as an engineer, you could, with that drawing before you, produce, as a matter of mere engineering skill, reinforcing for different size girders, columns, slabs, or other reinforced concrete work?

By the Court: Is that disputed?
Mr. Winter: I don't think so.

Mr. Griffin: I think it is. These gentlemen have said that this is limited—they confine their case, in fact, to their statement that this was intended only for slabs.

By the Court: *Well, I should find it otherwise from the patent itself. And I don't think they have insisted upon that.*

Mr. Griffin: Very good your Honor.

Q. 9. I will now hand you a copy of a patent to Rebert Kieserling, No. 73,004, a German patent and asked if you believed it commercially possible 110 to assemble a column having a considerable number of the usual commercial reinforcing spirals such as are illustrated in Figure 5, according to the manner of Figure 7-b? A. No. The expense of it would be prohibitive in a practical way.

Q. 10. Just why do you say that? A. Well, you would have to punch holes in that shape there, and you would have to thread the spiral through them. And I cannot see any practical way in which it could be done at any reasonable cost. You understand that reinforced concrete is such 111 a competitive business that anything that costs more money than some other method *simply goes right out of use immediately.*

Q. 11. If a column were so assembled and provided with a considerable number of spiral reinforcing—spirals with nine or more longitudinal bars, such as are illustrated in Figure 6 of the same drawing, do you think it would be possible to collapse that structure or not? A. Well, as a general proposition, it would not. It would depend a little bit on the method of fastening. As a general proposition, it would not be.

112 *Plaintiff's Exhibit No. 4.*

Q. 12. Do you or do you not find any integral prongs in this patent for securing the longitudinals to the spirals? A. I do not, no, sir.

Q. 13. I will show you patent 822,587 to R. A. Cummings of June 5th, 1906, and ask you if you have ever seen that before? A. I have seen the patent, yes, sir.

Q. 14. Would you consider that it required any great designing or engineering ability to produce a properly reinforced column with this Vandenburgh patent before you? A. Only the ordin-
113 ary designer's ability.

Mr. Winter:

Q. 15. Now, in discussing the German Kieslerling patent, you stated that that patent showed no integral prongs for holding the spiral in position? A. Yes—that one.

Q. 16. As far as the effect of the structure in concrete is concerned, would it make any difference whether you had integral prongs or whether you had the arrangement shown in Figure 7-b, where the spirals extend through holes in the
114 longitudinal bar? A. I would have a slight preference for the latter figure, Figure 7-b.

Q. 17. Now, as to these integral prongs, of which considerable has been said, what do you understand is their purpose in these hooped column constructions, and what is their advantage? A. Well, the usual procedure in practice is to build a hollow shell in which the reinforcement is placed, and then the concrete is poured in on top of it. Now, if this reinforcement is not well held in position the concrete will displace it, and it will prevent it from carrying out the functions that we have assumed that it would.

115

Re-direct Examination by Mr. Griffin:

Re-D.Q. 18. Do you think steel bars in columns for longitudinals would ever be placed outside the spirals to be of any value in reinforced concrete? A. They ought not to be so placed.

Re-D.Q. 19. If there is a slight oval form to the spirals, or even a considerable oval form, does that destroy their reinforcing effect? A. No, sir, it does not.

Re-D.Q. 20. What determines the number of longitudinals to be used and their size in any given instance? A. They can be of various sizes. They may vary from a very small amount, sufficient to hold the hoops in place, on up to a large amount, say two, three or even four per cent. of the columns; four per cent., though, is likely to be uneconomical.

116

Re-D.Q. 21. Has the securing of spirals by some means integral with the spacing bars any marked advantages? A. Yes, it holds the steel firmly in position while the concrete is being poured.

117

Re-cross Examination by Mr. Winter:

Re-xQ. 22. As an engineer for column construction, would you prefer a reinforcement with only one longitudinal bar, as shown in Defendant's Exhibit "W", or would you prefer bars symmetrically arranged with reference to the axis of the column? A. I would prefer more than one bar.

Mr. Griffin:

Re-xQ. 23. But that preference would be merely a matter of design, would it not? A. Yes.

118 *Plaintiff's Exhibit No. 4.*

By the Court:

Re-xQ. 24. As I understand you, the concrete is able to resist compression force when it sets ordinarily. And the use of the reinforcing material is to introduce a tensile material that will protect the concrete from injury and from other stresses than compression stresses? A. Yes, sir.

Re-xQ. 25. And it depends upon the tensile strength of the material and its grasp on the concrete, as to whether or not it is going to protect the shearing or the other stresses? A. I
119 think that is correct, your Honor.

Re-xQ. 26. And a great deal of modern construction is made, both of columns and beams and floor construction, with loose and unconnected pieces of metal, either in the shape of rods or bands, and placed so that there would be some grasp either of the rod upon the concrete or the concrete upon the rod? A. In modern construction, they are getting now more and more to the idea of fastening them together. A great deal of trouble is caused in actual construction by displacement.

120 Re-xQ. 27. I understand. That is simply to hold it together until the concrete is placed around it. That is the main purpose, isn't it? A. Yes; the concrete gets a very weak grip on the steel, and, in order to reinforce it, some form of reinforcement has been introduced. The main trouble with concrete that I have had has been in the line of shear, which this arrangement here, and various other devices, are to protect.

Plaintiff's Exhibit No. 4. 121

JOHN M. CHESTER (on behalf of plaintiff) testified as follows:

Q. 1. What is your age? A. Fifty-two.

Q. 2. Place of residence? A. Pittsburgh, Pennsylvania.

Q. 3. And what was your early education? A. Graduate of the University of Illinois in Civil Engineering.

Q. 4. Any other education? A. Well, I had a preliminary education at high school.

Q. 5. And what are you doing at the present 122
time? A. Practicing the profession of civil engineering for thirty-five years.

Q. 6. Where? A. Twenty years of that time in Pittsburgh.

Q. 7. What kind of structures do you erect? A. All types called for in the building power houses, water and sewer purification, and bridges.

Q. 8. Ever erect any reinforced concrete buildings? A. A great many.

Q. 9. What kind? A. Well, I would limit that not to reinforced concrete throughout, but reinforced members of framework and reinforced 123
bridges.

Q. 10. How long have you been erecting reinforced concrete buildings? A. In 1905 and '6 I erected the first structure.

Q. 11. Who designed it? A. It was designed by myself, and under my direction, by a draftsman.

Q. 12. You have testified as an expert in cases before this? A. I have.

Q. 13. Do you understand the matter of patent office drawings and specifications? A. I think I do.

124 *Plaintiff's Exhibit No. 4.*

Q. 14. I will show you two copies of patents, one Patent No. 822,587, to Cummings, of June 5, 1906, and a copy of the reissue patent, 14,182 to Vandenburgh, of August 15, 1916, the original of which is patent 841,741, January 22, 1907, and ask you if you understand the construction therein outlined? A. I believe I do.

Q. 15. Regardless of the date of each patent, which do you deem the most advantageous type of construction in the art? A. In my opinion, the Vandenburgh permits the more advanced con-
125 struction of the art.

Q. 16. Could any competent engineer design columns, girders, or floor slabs with the Vandenburgh patent before him, to carry different loads in those slabs and columns, which are of different sizes and lengths, without the exercise of anything more than the usual skill of a draftsman or an engineer? A. I think they could.

Q. 17. Has that particular type, the spiral with the longitudinal bar inside the spiral and secured to the spiral, any particular or definite advantages? A. It has.

126 Q. 18. What are they? A. They are principally commercial. To obtain the same strength and utility, it is cheaper to construct.

Q. 19. Are there other advantages mechanically in securely fastening the coil to the bar? A. There are. The necessity arises for some method of fastening the coil to the bar, for supporting and maintaining the coil in its natural condition during the process of introducing the concrete; and also adding further strength to the structure in some types or designs in which it is employed.

Cross-Examination by Mr. Winter:

xQ. 20. You have stated that the construction of the Vandenburgh patent allows the obtaining of strength and uniformity, which would cheapen the cost. With what were you comparing it when you made that answer? A. With other types of construction, such as the band or the hoop.

xQ. 21. Of the Cummings patent, which is before you? A. Yes.

xQ. 22. You had that specifically in mind? A. 128
Yes, sir.

xQ. 23. What is there in the Vandenburgh construction which enables you to get a strength and uniformity that is cheaper in cost of construction than the Cummings construction? A. The spiral compared with the hoop. The spiral needs no welding or clip fastening or hook. If the strength of the hoop is provided in the hook or joint. It becomes much more expensive than the same strength if obtained through the spiral.

xQ. 24. Is it your position that a spiral hooping has the same efficiency and utility as a horizontal hooping, or that the members have the 129
same strength? A. Well, I would defer to the hoop, a differential over the spiral. With the same gauge of material.

xQ. 25. As far as strength is concerned? A. Yes, sir.

xQ. 26. And, as far as resisting the tendency of the column to fracture? A. Inferentially, I think so.

xQ. 27. So the problem comes down to whether you would use continuous hoops with their slight differential in favor of utility, as compared with the spiral, on account of the greater cheapness

130 *Plaintiff's Exhibit No. 4.*

of the spiral? A. It is a commercial proposition wholly.

xQ. 28. As an engineer, is there any advantage in using a hoop which is formed of metal of round cross section, as compared with one that is bored and flat, such, for instance, as the hooking in the Cummings patent? A. The round being drawn, the flat being rolled, the round is always the stronger metal in tensile strength than the flat. And, therefore, somewhat less material may be employed. In other words, wire is
131 stronger than rolled bands.

No. 841,741.

G. E. VANDENBURGH. PATENTED JAN. 22, 1907.

REINFORCING BAR.

APPLICATION FILED MAY 9, 1906.

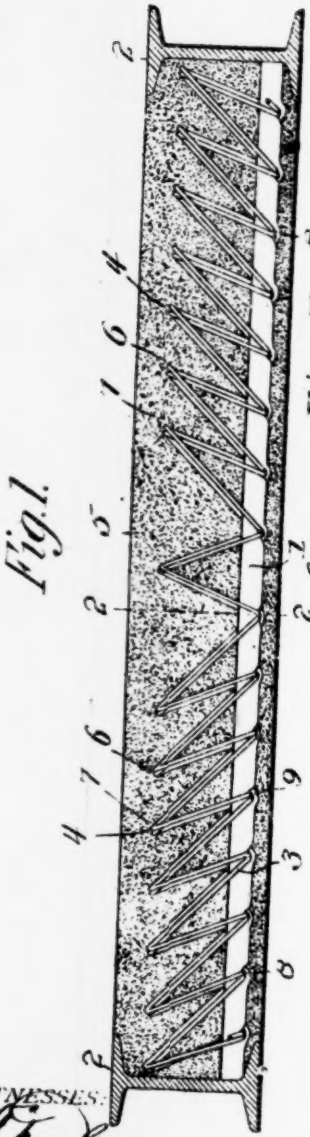


Fig. 1.

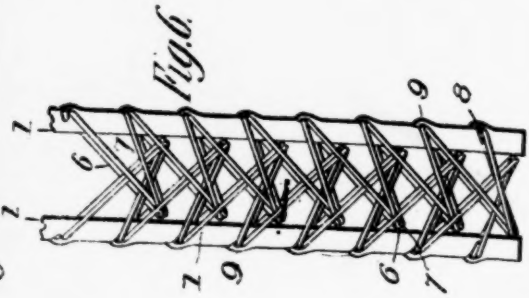


Fig. 6.

Fig. 5.

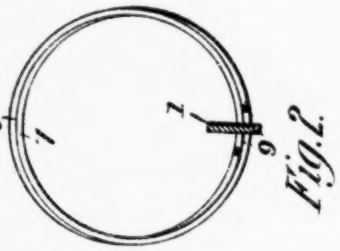


Fig. 2.

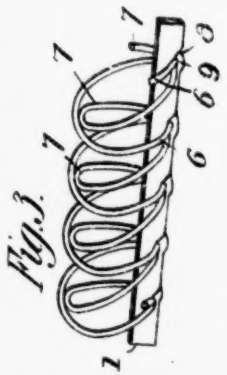


Fig. 3.

Fig. 4.

WITNESSES:

W. F. Kerby.

Alfred J. Gage

INVENTOR

George E. Vandenburgh,

BY E. B. Stocklin

Attorney

UNITED STATES PATENT OFFICE.

GEORGE E. VANDENBURGH, OF WASHINGTON, DISTRICT OF COLUMBIA.

REINFORCING-BAR.

No. 841,741. Specification of Letters Patent. Patented Jan. 22, 1907.

Application filed May 9, 1906. Serial No. 315,959.

REISSUED

To all whom it may concern:

Be it known that I, GEORGE E. VANDENBURGH, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Reinforcing-Bars, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a reinforcing-bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby.

The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic material which provides the maximum of supporting strength in the arch or surface to be formed.

Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 is a vertical section showing the bar applied to supporting girders or beams. Fig. 2 is an enlarged vertical section on the line 2 2, Fig. 1. Fig. 3 is a detail perspective of the primary and secondary coils shown in Fig. 1. Fig. 4 is a similar view of a modified form using one coil. Fig. 5 is a detail plan of the form shown in Fig. 3, and Fig. 6 is an elevation of two meshing coils used for girder and column construction.

Like numerals of reference indicate like parts in the several figures of the drawings.

The numeral 1 designates a bar which may be of any desired construction or configuration and supported in any preferred manner. For instance, when used in arch construction it is adapted to rest upon the base of the beams or girders 2 sufficiently above the lower surface thereof to provide for the facing of the concrete or cement beneath the lower face of the bar. The coils 4 are secured to the bar in any desired manner—for instance, as hereinafter described—and the plastic material or cement-filling 5 applied so as to surround the coils and bar and embed the same therein to form a truss construction.

The bar may be provided with a primary coil 6, extending in one direction, as shown in Fig. 4, which is sufficient in light construction; but when a heavier construction is to be used a secondary coil 7 is provided, which extends in the opposite direction to the coil 6 and through the same so as to cross beneath the coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted. This preferred construction is shown in Figs. 1 and 3, and it is also desirable that both of the coils be deflected away from the center of the bar, as shown in Fig. 1, as the greatest supporting strain carried by the arch is at the center thereof, and this deflection therefore resists such strain and tends to draw the coils upward into a position at right angles to the bar.

As a preferred means of securing the coils to the bar I have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and held therein by means of the integral spurs 9, which are forced downward upon the coils when inserted and permanently retain them in position.

In Fig. 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other, with their coils intermeshing, for use in column or girder construction, wherein such a construction provides the maximum of strength with the minimum of weight in the reinforcing material.

In the operation of the invention it will be seen that the bar supporting the coil resists any movement thereof longitudinally of the bar and provides the necessary strength upon which the truss structure formed by the coils is carried. These coils being extended in opposite directions and embedded in the material provide the maximum strength to resist either lateral or longitudinal pressure with the minimum weight and quantity of material, as owing to their opposite direction of curvature they effectually oppose the strain placed thereon, while their deflection toward the opposite ends of the bar resists the central downward strain of the arch.

It will be seen that this form of bar is very simple and economical in construction

while embodying the greatest efficiency in use. This bar, although described in connection arch and column construction, is adapted for use in any character of metal, reinforced concrete, or cement construction.

Having now described my invention and set forth its merits, what I claim, and desire to secure by Letters Patent, is—

1. In a reinforcing-bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point.

2. In a reinforcing-bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point, said coils being deflected in opposite directions from the center of the bar toward the ends thereof.

3. A reinforcing-bar provided upon one end with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

4. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

5. A reinforcing-bar provided with a spirally-disposed coil secured thereto and extended free of said bar, and a secondary spirally-disposed coiled strand secured to the bar and extending in the opposite direction to the first-mentioned coil.

6. A reinforcing-bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first-mentioned coil throughout the length thereof.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE E. VANDENBURGH.

Witnesses:

ALFRED T. GAGE,

JOHN L. FLETCHER.

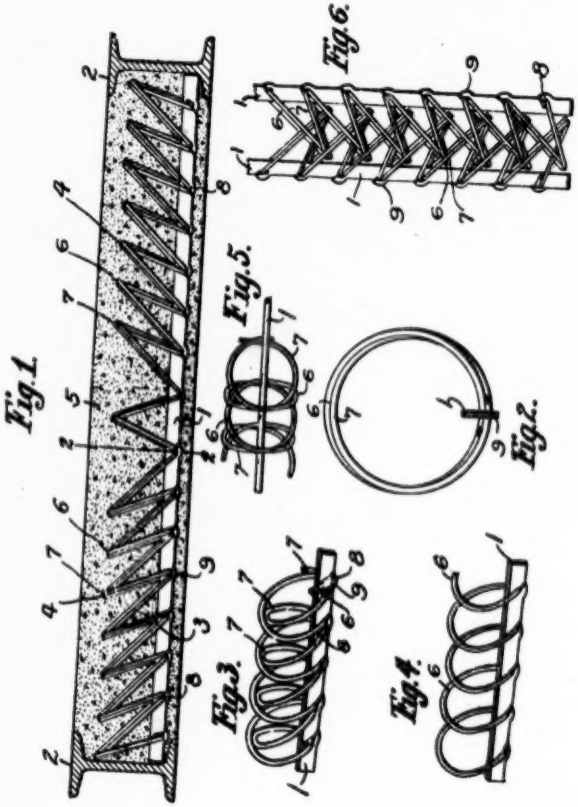
G. E. VANDENBURGH.

REINFORCING BAR.

APPLICATION FILED JULY 1, 1916.

Reissued Aug. 15, 1916.

14,182.



INVENTOR.
George E. Vandenburgh.

BY
Carlos P. Griffin
ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE R. VANDENBURGH, OF SAN FRANCISCO, CALIFORNIA.

REINFORCING-BAR.

14,182. Specification of Reissued Letters Patent. Reissued Aug. 15, 1916.

Original No. 841,741, dated January 22, 1907, Serial No. 315,959. Application for reissue filed July 1, 1916. Serial No. 107,203.

To all whom it may concern:

Be it known that I, GEORGE E. VANDENBURGH, a citizen of the United States, and recently of Washington, District of Columbia, and now residing at San Francisco, California, have invented certain new and useful Improvements in Reinforcing-Bars, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a reinforcing-bar particularly adapted for cement and concrete construction wherein the bar is embedded in the plastic body to be supported thereby.

The invention has for an object to provide a reinforcing-bar with one or more spirally-disposed coils secured to the bar so as to provide an extended area of contact adapted to resist strain longitudinally and laterally of the bar and to form a truss within the body of concrete or other plastic material which provides the maximum of supporting strength in the arch or surface to be formed.

Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 is a vertical section showing the bar applied to supporting girders or beams. Fig. 2 is an enlarged vertical section on the line 2—2, Fig. 1. Fig. 3 is a detail perspective of the primary and secondary coils shown in Fig. 1. Fig. 4 is a similar view of a modified form using one coil. Fig. 5 is a detail plan of the form shown in Fig 3, and Fig. 6 is an elevation of two meshing coils used for girder and column construction.

Like numerals of reference indicate like parts in the several figures of the drawings.

The numeral 1 designates a bar which may be of any desired construction or configuration and supported in any preferred manner. For instance, when used in arch construction it is adapted to rest upon the base of the beams or girders 2 sufficiently above the lower surface thereof to provide for the facing of the concrete or cement beneath the lower face of the bar. The coils 4 are secured to the bar in any desired manner—for instance, as hereinafter described—and the plastic material or cement-filling 5 applied so as to surround the coils and bar and embed the same therein to form a truss construction.

The bar may be provided with a primary coil 6, extending in one direction, as shown in Fig. 4, which is sufficient in light construction; but when a heavier construction is to be used a secondary coil 7 is provided, which extends in the opposite direction to the coil 6 and through the same so as to cross beneath the coil 6 at a point directly above the bar, thus providing a construction in which all lateral pull or strain of the coil is avoided, owing to the equalization thereof by the oppositely-extending coils and the tendency of the coils to move or flatten toward the face of the bar resisted. This preferred construction is shown in Figs. 1 and 3, and it is also desirable that both of the coils be deflected away from the center of the bar, as shown in Fig. 1, as the greatest supporting strain carried by the arch is at the center thereof, and this deflection therefore resists such strain and tends to draw the coils upward into a position at right angles to the bar.

As a preferred means of securing the coils to the bar 1 have shown a series of kerfs 8 in one face of the bar inclined away from the center of the bar toward the opposite ends thereof, and the coils are seated within these kerfs and held therein by means of the integral spurs 9, which are forced downward upon the coils when inserted and permanently retain them in position.

In Fig. 6 a modified application of the invention is shown where two of the bars are disposed parallel to each other, with their coils intermeshing, for use in column or girder construction, wherein such a construction provides the maximum of strength with the minimum of weight in the reinforcing material.

In the operation of the invention it will be seen that the bar supporting the coil resists any movement thereof longitudinally of the bar and provides the necessary strength upon which the truss structure formed by the coils is carried. These coils being extended in opposite directions and embedded in the material provide the maximum strength to resist either lateral or longitudinal pressure with the minimum

weight and quantity of material, as owing to their opposite direction of curvature they effectually oppose the strain placed thereon, while their deflection toward the opposite ends of the bar resists the central downward strain of the arch.

It will be seen that this form of bar is very simple and economical in construction while embodying the greatest efficiency in use. This bar, although described in connection with arch and column construction, is adapted for use in any character of metal, reinforced concrete, or cement construction.

Having now described my invention and set forth its merits, what I claim, and desire to secure by Letters Patent, is—

1. A concrete reinforcing consisting of a bar having a plurality of integral spurs, and a spiral coil permanently secured thereto by having the spurs bent down on the several coils, the coils extending beyond and free of the bar at the opposite side therefrom to the securing point.

2. A concrete reinforcing consisting of a bar having integral means to secure a coil thereto, and a spiral coil permanently secured to the bar in each convolution and extended beyond and free of said bar at the opposite side therefrom to the securing point.

3. A reinforcing-bar provided upon one edge with a series of kerfs each having an integral overlapping spur, and a coil disposed in said kerfs, each convolution thereof being retained beneath one of said spurs.

4. In a reinforcing-bar, a spiral coil permanently secured thereto by spurs bearing on each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing-point, said coils being deflected in opposite directions from the center of the bar toward the ends thereof.

5. A reinforcing-bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

6. A reinforcing-bar provided with a spirally-disposed coil secured thereto and extended free of said bar, and a secondary spirally-disposed coiled strand secured to the bar and extending in the opposite direction to the first mentioned coil.

7. A reinforcing-bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first-mentioned coil throughout the length thereof.

In testimony whereof I have hereunto set my hand this 24th day of June, 1916.

GEORGE E. VANDENBURGH.

PLAINTIFF'S EXHIBIT "NO. 5"
Defendant's Catalog Page 6.

HAVEMEYER BAR SERVICE

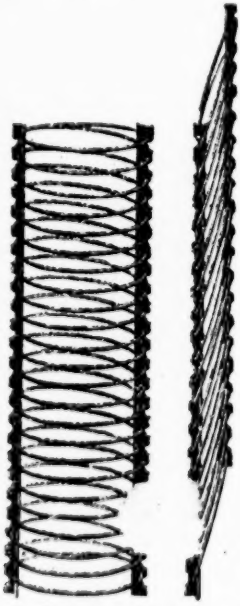
ENGINEERING.

Concrete Steel Company maintains experienced and efficient Engineering Departments in their District Sales Offices for the use of our customers. These Engineering Departments would be glad to co-operate in making up designs, estimates and plans on any type of reinforced concrete structure.

SHOP SERVICE AND BENDING FABRICATION.

Our warehouses and shops are equipped to economically bend bars to any desired shape and to fabricate into units ready to place in the forms. Shop bending is more accurate and less expensive than field bending. By using this service, the engineer and contractor may be assured of securing bars correctly bent, the bars being shipped to the work properly bundled and tagged, ready to place in the forms. The expense of a bending "gang" and bending tables on the job is thus entirely eliminated.

Collapsible Column



Collapsible Spiral

HAVEMEYER COLLAPSIBLE SPIRALS.

Havemeyer Collapsible Spirals are manufactured in our own shops, using a rigid spacer, and unless otherwise ordered, are equipped with two spacers and shipped collapsed. An angle spacer is used, the size varying with the size and weight of spiral. This type of spiral has proven the most economical and satisfactory.

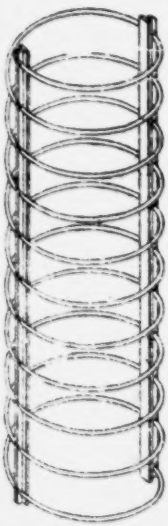
HAVEMEYER COLLAPSIBLE COLUMN.

The Havemeyer Collapsible Column is made up by using Havemeyer Bars for longitudinal members and for bands. The bands are attached to the longitudinal members by the use of Bar-Tys. These columns are shipped collapsed and are readily opened and set in place.

PLAINTIFF'S EXHIBIT NO. 7

Interlock Spiral Concrete Reinforcing

Spirals are five times as efficient as vertical steel in columns



Column set up ready for use

INTERLOCK SPIRALS have been used in millions of dollars' worth of buildings, one company has sold many thousands of TONS of them.

INTERLOCK SPIRALS may be used for columns or beams, and insure integral locking of EVERY SPIRAL at one-fifth the cost of hand wired joints.

INTERLOCK SPIRALS are stiff enough to save labor.

INTERLOCK SPIRALS insure machine precision in the field and unskilled labor can properly place and lock every spiral in LESS TIME than any other.

INTERLOCK SPIRALS can be shipped to you secured together and COLLAPSED as in the lower cut, if you wish, at the lowest freight rate.

INTERLOCK SPIRALS can be used with much or little OTHER REINFORCING as your specifications demand.

INTERLOCK SPIRALS have too many advantages to set forth in this short circular, and may be had of the **CONCRETE STEEL PRODUCTS CO., CHICAGO, ILL.**

There are many types of bars.

INTERLOCK SPIRALS can only be used where they bear the proper license tags under patent No. 841,741, Jan. 22, 1907, and reissue patent No. 14,182, Aug. 15, 1916; BASIC U. S. PATENTS on all forms of integral securing means for connecting the spacing bars to the spirals. All others are infringements and notice is hereby given to all users and manufacturers to discontinue the manufacture, use and sale of such bars immediately.

Suits in the United States District Courts for injunctions and accounting have been instituted against the **ELECTRIC WELDING CO., PITTSBURGH, PA., TRUSSED CONCRETE STEEL CO., YOUNGSTOWN, OHIO,** and **CONCRETE STEEL CO., NEW YORK, N. Y.** Other suits are to be entered against infringers, including users, as rapidly as the evidence can be collected. It is the intention of the inventor to vigorously protect himself against all unlawful piracy on the part of manufacturers and users of this reinforcing.

Pathetic pleas in a vain endeavor to beat the inventor are now being made.

Communicate with if interested

CARLOS P. GRIFFIN,
704 Pacific Building, San Francisco,
Attorney for G. E. Vandenburgh.

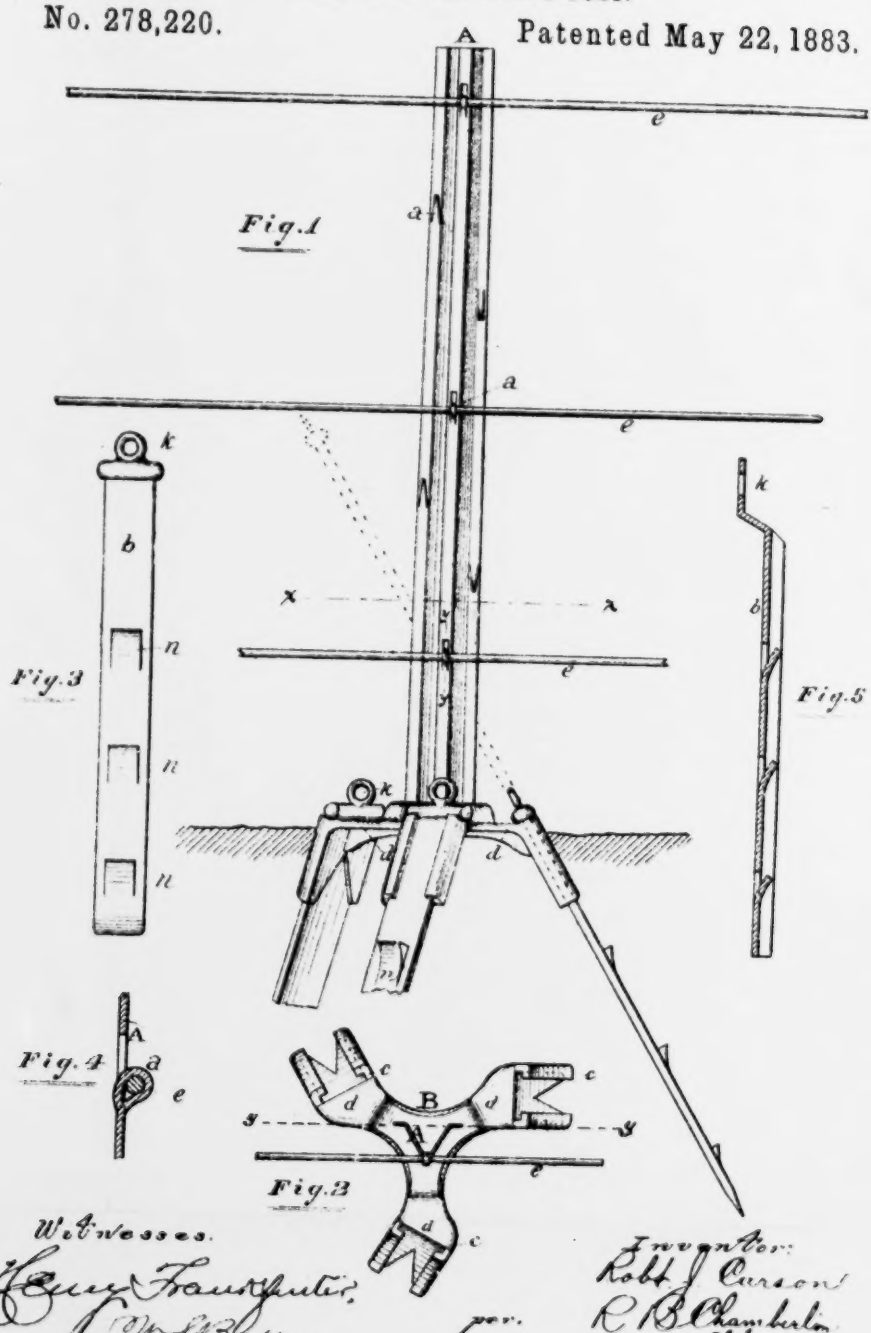
Column collapsed ready for shipment

(No Model.)

R. J. CARSON.

IRON OR STEEL FENCE POST.

No. 278,220. Patented May 22, 1883.



Witnesses.

Henry Fauchuter.

W. H. Baker

Inventor:

Robt. J. Carson

per. R. B. Chamberlin

Attorney

UNITED STATES PATENT OFFICE.

ROBERT J. CARSON, OF CHICAGO, ASSIGNOR OF ONE-HALF TO EDWARD RUTZ, OF SPRINGFIELD, ILLINOIS.

IRON OR STEEL FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 278,220, dated May 22, 1883.

Application filed April 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. CARSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Iron or Steel Fence-Posts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in fence-posts, being particularly designed for the construction of barbed-wire fences; and it consists of a post that is formed from sheet metal, that is secured to a base having radial arms, which arms have at their outer ends downwardly-projecting annular bearing-grooves, in combination with pegs or braces of suitable construction, that are adapted to be driven through the grooves and into the ground for securing the posts thereto, the posts being provided with suitable means for attachment of the barbed wire, as will be more fully described hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of a fence-post with its attachments complete. Fig. 2 is a cross-section on the line X X of Fig. 1. Figs. 3, 4, and 5 are detail views.

A represents a post formed of sheet metal, of any suitable thickness, and which is preferably triangular in cross-section, as shown in Fig. 2. This post is secured in any suitable manner to the base-plate B, which base-plate has projecting from it the radial arms D, the outer ends of which are inclined at a suitable angle downward, and have their inner sides in a line with the adjacent side of the angle formed by the post, as shown at Y Y, Fig. 2. These downwardly-turned projections are provided with a suitable groove, *c*, which adapts them to receive the pegs *b*, that are adapted to be driven through them and forced into the ground for securing the post in position. In order to anchor these pegs more firmly in position when driven into the ground, they are provided with barbs *a*, which may be either stamped out from the pegs, (which are preferably made of flat sheet metal,) or they may be cast thereon, if preferred. The tops of these pegs have secured to them the rings K, through which a crow-bar may be passed to secure leverage when it is desired to draw the pegs from the ground in order to remove the post. In order to secure the barb-wires to the post, I provide the post with ears *a*, which may be stamped therefrom or riveted thereto, and which ears are adapted to be bent over the wire *c*, as shown in Fig. 4.

A fence-post thus constructed is light, and is cheaply made, will be found exceedingly durable, and may easily be removed, after having been put in position, when it is desired to move the fence.

Having thus described my invention, I claim—

1. The combination of a fence-post of suitable construction, a base-plate, B, provided with radial arms *d*, turned-down ends having grooves *c* formed in them, and pegs *b*, that are adapted to secure the base-plate in position by being driven through the grooves, with which they are provided, into the ground, substantially as described.

2. The combination of the post A, formed of sheet metal, and provided with ears *a* for securing the wires thereto, a base-plate, B, having radial arms *d*, and the turned-down ends having grooves *c*, these ends being arranged so as to have their inner sides in a line with the adjacent side of the fence-post, and pegs *b*, that are adapted to be driven through the grooves and into the ground for securing the base-plate in position, the said pegs being provided with barbs, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT J. CARSON.

Witnesses:
A. B. TALLMAN,
WILLIAM H. MCGUIRE.

(No Model.)

C. PRESCOTT & M. H. BENNETT.

SAND SCREEN.

No. 447,162. Patented Feb. 24, 1891.

Fig. 1.

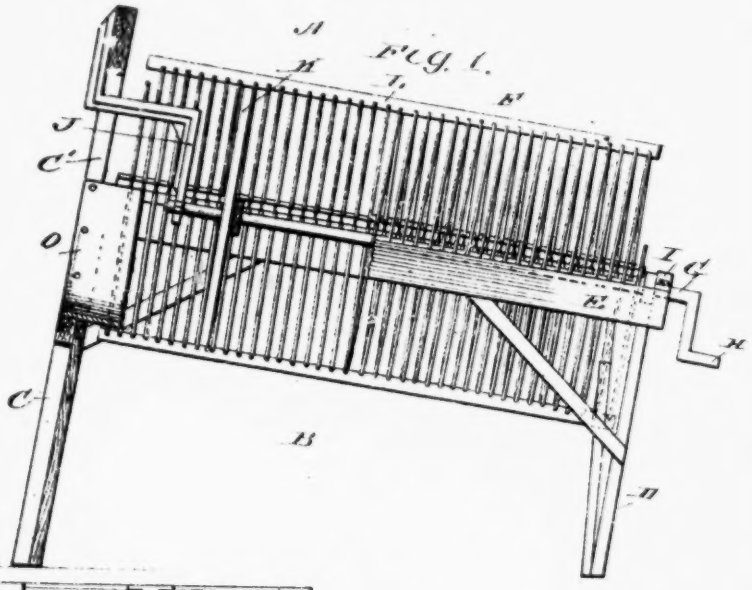


Fig. 2.

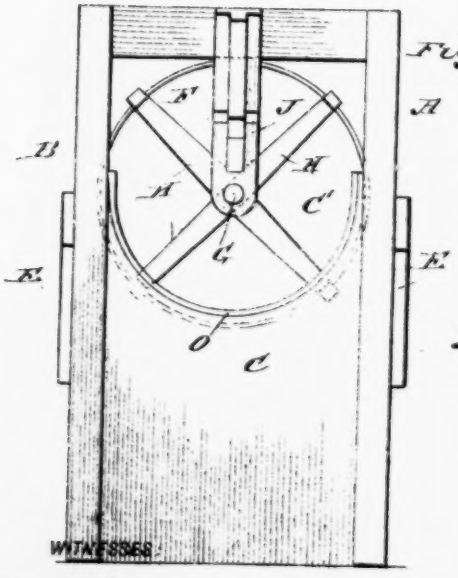
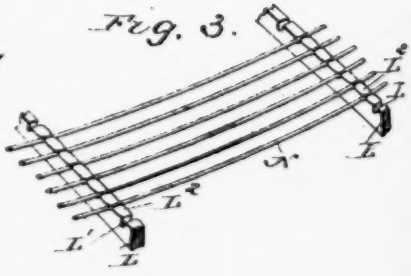


Fig. 3.



WITNESSES:

W. R. Davis.

E. M. Clark

INVENTOR:

C. Prescott

M. H. Bennett

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES PRESCOTT AND MOSES H. BENNETT, OF FAIRMOUNT, NEBRASKA.

SAND-SCREEN.

SPECIFICATION forming part of Letters Patent No. 447,162, dated February 24, 1891.

Application filed June 30, 1890. Serial No. 357,269. (No model.)

To all whom it may concern:

Be it known that we, CHARLES PRESCOTT and MOSES H. BENNETT, of Fairmount, in the county of Fillmore and State of Nebraska, have invented a new and Improved Sand-Screen, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved sand-screen which is simple and durable in construction, very effective in operation, and quickly separates the fine sand from the coarser materials, such as gravel, &c.

The invention consists in certain parts and details and combinations of the same, as will be described hereinafter, and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement with parts in section. Fig. 2 is an upper end view of the improvement; and Fig. 3 is a perspective view of part of the screen, showing the fastening of the coiled wire to the longitudinal bars.

The improved sand-screen A is provided with a suitable frame B, having an inclined head C and a foot D, said head and foot being connected with each other by suitable beams E. In the frame B is arranged a screen F, having a longitudinal and slightly-inclined shaft G, carrying at its lower end a crank-arm H for conveniently turning the shaft and its screen. The shaft is mounted near its lower end in a bearing I secured on the foot D, and the upper end of the said shaft is journaled in a bracket J, secured to the head C and projecting through the opening C′ in the latter a suitable distance into the screen F, as is plainly shown in Fig. 1. The bracket J is arranged in this form so as to present no obstruction when introducing material through the opening C′ into the upper end of the screen F.

On the shaft G are secured sets of spokes K, which support at their outer ends longitudinally-extending bars L, each provided with recesses L′ formed on their inner sides and adapted to receive the coils of a wire N forming the meshes of the screen. The wire N is coiled in cylindrical form and is passed into the several recesses L′ of the longitudinal bars L, after which the part L′ extending between two successive recesses L′ is hammered so as to cover the coil, thereby holding the latter in place on the longitudinal bars. The coil of wire N extends throughout the length of the bars L and the coils are placed suitable distances apart, according to the material under treatment.

In the bottom of the opening C′ is secured a semicircular plate O, which extends into the upper end of the screen F, so that the material passed over the said plate O is guided onto the upper end of the screen. As the latter is placed in an inclined position, the material readily passes from the upper end of the screen toward its lower end when the shaft G is turned, and the material is constantly agitated by the revolution of the screen, so that the fine sand falls through the meshes formed by the coils of the wire N between the head C and the foot D, while the coarser material travels along the screen to the lower end and drops out of the latter at the outside of the foot D.

It will be seen that a screen formed in this manner is very simple and durable in construction, can be cheaply manufactured, and is not liable to get out of order. The bars L are preferably of a soft metal, so as to permit easy riveting of the parts L² to lock the coils of the wire N in place.

The bars L may be placed inside the coil of wire N, and in this case the recesses L′ are formed on the outer side or top of the bars.

Having thus described our invention, we claim as new, and desire to secure by Letters Patent—

The herein-described screen, comprising the frame B, having a circular opening C′ in its front, a double angle-bracket J, secured to the front of the frame, projecting through the said opening, and having a shaft-bearing in the lower end of its inner depending arm, a bearing I at the opposite end of the frame, a rotary sieve having a central shaft G mounted in the said bearings, the bracket J, projecting into the interior of the screen, as shown, and the curved plate O, projecting inwardly from the bottom of the opening C′, substantially as set forth.

CHARLES PRESCOTT.
MOSES H. BENNETT.

Witnesses:
CLARK ROBINSEN,
J. E. CURTISS.

(No Model.)

J. NORWOOD.

SCREEN FOR SAND, &c.

No. 571,575. Patented Nov. 17, 1896.

Fig. 3.

Fig. 4.

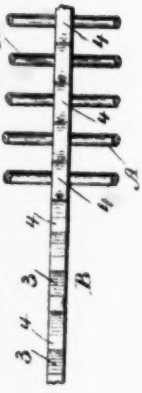


Fig. 2.

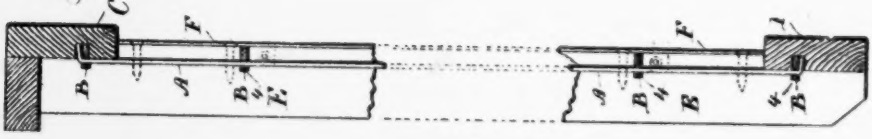
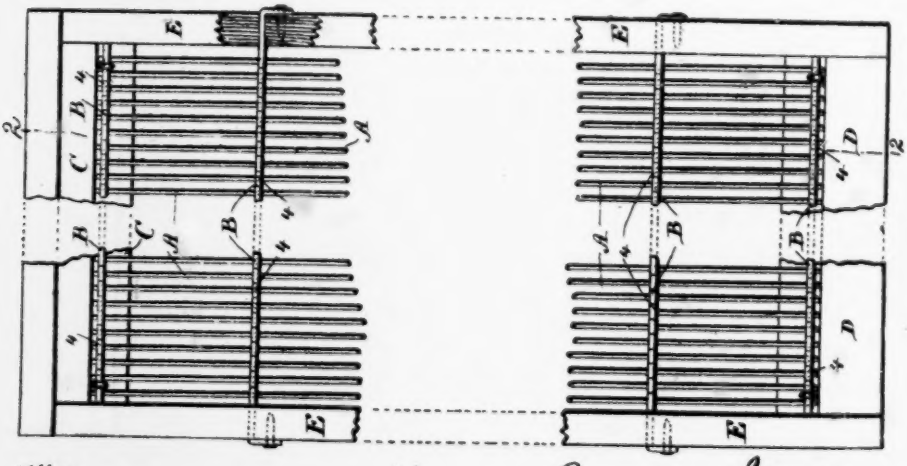


Fig. 1.



Witnesses
Chas. H. Smith
J. Stail.

Inventor
Joseph Norwood
by L. W. Serrell & Son
Attys

UNITED STATES PATENT OFFICE.

JOSEPH NORWOOD, OF BROOKLYN, NEW YORK

SCREEN FOR SAND, &c.

SPECIFICATION forming part of Letters Patent No. 571,575, dated November 17, 1896.

Application filed March 11, 1896. Serial No. 582,719. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH NORWOOD, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Screens for Sand, &c., of which the following is a specification.

Screens have heretofore been made with longitudinal parallel wires and the wires have been kept at the proper distances apart by cross-lacings of wire, and in some instances the lacing-wires have also secured transverse rods. This involves considerable hand labor and the expense is correspondingly increased. In other instances the parallel wires have been let into notches in the edges of bars and the metal at the ends of the notches has been upset or riveted, so as to spread the same partially over the wires and hold them in position; but this mode of securing the wires is unreliable and requires considerable labor in spreading or upsetting the metal to secure the wires.

The object of the present invention is to simplify the construction of the screen, lessen the cost of the same, and render the connection between the wires and the cross-bars stronger and more durable.

I make use of parallel wires held together by one or more cross-bars, each cross-bar being made with diagonal incisions for the reception of the wires, and which wires are held firmly in position by bending down the hook-shaped points of the cross-bars at the acute angles between the slots and the edges of the cross-bars, thus firmly grasping and holding the parallel wires; and in constructing a sand-screen I use similar cross-bars at the top and bottom ends, the same being introduced into grooves or between transverse slats at the top and bottom ends of the screen, and the ends of the cross-bars are bent up at right angles, so as to firmly hold the side pieces of the screen-frame in their proper relative positions.

In the drawings, Figure 1 is an elevation representing the top and bottom portions of a sand-screen, one of the side pieces being in section. Fig. 2 is a longitudinal section at the line 2 2. Fig. 3 shows part of one of the cross-bars with some of the wires in position and with some of the slots open ready for the reception of the longitudinal wires, and Fig. 4 is a plan of the parts shown in Fig. 3.

The parallel bars A or wires are of any desired size, shape, and length, and the cross-bars B are applied at suitable distances apart, and each cross-bar is of the desired strength and preferably of a comparatively soft steel, and in one edge of each cross-bar slots 3 are made by the action of a suitable die and punch or by saws or cutters. Each slot is diagonal, so as to leave the metal at one side of the slot in the form of an acute angle, and the slots are sufficiently deep for the acute angles to form hooks 4, and the wires are introduced into the slots and resting at the bottoms of the slots the hooks 4 are pressed down or bent over the wires, so as to retain them in position in a very firm and reliable manner, and by making the slots in the form represented in Fig. 3 the acute-angle hooks 4 can be bent down rapidly by a roller or other tool forcibly brought into contact with the edge of the bar and passed across the same.

It is advantageous to bend the ends of the wires A at right angles, so as to come outside the top and bottom cross-bars of the screen and thus prevent end motion to such wires.

Screens made in this manner can be made up into any desired form, and where they are employed with a wooden frame, as shown in the drawings, for use in screening sand, ashes, or other materials, the top and bottom cross-bars and the bent ends of the wires A are received into grooves in the top and bottom cross-pieces C and D, which connect the side pieces E at the upper and lower portions of the screen, or these top and bottom cross-bars B may be received between two of the slats or cross-pieces forming the top and bottom ends of the screen.

The intermediate cross-pieces B on the screen are made sufficiently long for their ends to project beyond the side pieces E, and such cross-pieces are received into notches or saw-cuts in the back edges of such side pieces E, and they are bent outwardly and at right angles and preferably secured by screws or nails passing through the perforated ends of the cross-bars, so as to connect the side pieces E firmly to the cross-bars, and I usually employ bands F, nailed or screwed to the back edges of the side pieces E, as an ad-

ditional support for holding the cross-bars B in their proper positions.

I claim as my invention—

1. The combination in a screen with the top and bottom cross-pieces having grooves in their surfaces, of longitudinal parallel wires having their ends bent at right angles, cross-bars each having diagonal slots forming acute-angle hooks, the slots receiving the wires and the hooks bent down to hold such wires in place, the intermediate cross-bars being secured at their ends to the side members of the frame and the cross-bars at the respective ends of the parallel wires being received with the bent ends of such wires into the grooves of the top and bottom cross-pieces of the frame, substantially as set forth.

2. The combination in a screen with the parallel wires, of cross-bars slotted diagonally and receiving the wires, the acute-angled hooks of the cross-bars being bent down to hold the wires in position and the ends of the cross-bars being bent at right angles, the cross-pieces C D and the side frames connected together, such side frames being notched for the passage of the end portions of the cross-bars, and to which side pieces the ends of the cross-bars are connected, substantially as set forth.

Signed by me this 9th day of March, 1896.

JOSEPH NORWOOD.

Witnesses:

GEO. T. PINCKNEY,

MARY L. BYRNE.

(No Model.)

R. V. CLARK.

FENCE STAY.

No. 589,593. Patented Sept. 7, 1897.

Fig. 1.

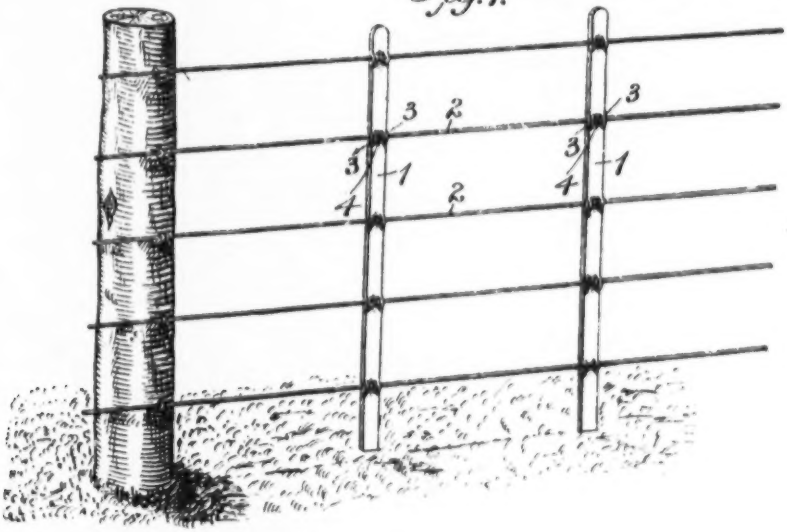


Fig. 2.

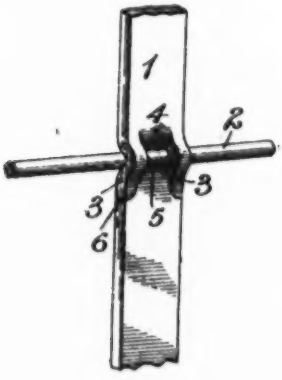


Fig. 3.

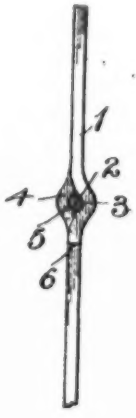
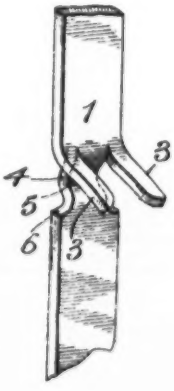


Fig. 4.



Witnesses
Edwin G. McKee
O. E. Doyle

Inventor
Robert V. Clark.

By his Attorneys,
Cashow & Co.

UNITED STATES PATENT OFFICE.

ROBERT V. CLARK, OF TIFFIN, OHIO.

FENCE-STAY.

SPECIFICATION forming part of Letters Patent No. 589,593, dated September 7, 1897.

Application filed May 15, 1897. Serial No. 636,656. (No model.)

To all whom it may concern:

Be it known that I, ROBERT V. CLARK, a citizen of the United States, residing at Tiffin, in the county of Seneca and State of Ohio, have invented a new and useful Fence-Stay, of which the following is a specification.

My invention relates to fences, and particularly to stays for use in connection with wire fences to engage and secure the runners in the desired relative positions; and the object in view is to provide a simple and efficient construction of lock or runner-engaging device whereby the parts are securely held against independent relative movement and whereby in case of necessity the runner may be disconnected to provide for replacing or splicing a broken runner.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claim.

In the drawings, Figure 1 is a view of a fence having its runners connected by means of stays constructed in accordance with my invention. Fig. 2 is a detail view in perspective of a portion of a stay with a lock thereof engaged with a runner. Fig. 3 is an edge view of the same. Fig. 4 is a detail view in perspective of a portion of a stay with the tongues of the lock deflected, as seen before applying the same to a runner.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a stay provided at intervals with locks for engagement with runners 2, the intervals between the locks corresponding with the desired intervals between the runners. Each lock is formed by providing longitudinal cuts or slits in the stay contiguous to and parallel with the side edges thereof, and thereby providing tongues 3, which are free at their lower extremities, in order to engage over a runner, said tongues being integral with the stay; also, the reduced portion 4 of the stay between the upstruck tongues is crimped to form a transverse seat 5 for the reception of the runner, while the tongues are crimped in the opposite direction by the operation of folding them toward the plane of the stay after the introduction of the runner, whereby the distance between the point of junction of each tongue with the body portion of the stay and the lower end of the recess from which the tongue has been struck is equal to the length of the tongue. Hence when the tongue is folded rearwardly until its extremity is in the plane of the body portion of the stay said extremity is also approximately in contact with the lower end of the recess from which it was struck. The shoulder 6 at the lower end of the recess thus forms a guard, approximately in contact with which the extremity of the tongue is arranged, whereby passing objects are prevented from being caught by the extremities of the tongues, and yet a forward pressure upon the lower extremities of the tongues, applied from the rear of the stay, will be sufficient to displace the free ends of the tongues, and thereby enable a stay to be disconnected.

From the above description it will be seen that the essential feature of the invention resides in the fact that the tongues are formed at opposite side edges of the stay by means of cuts or slits formed approximately parallel with said side edges, said tongues and the intermediate reduced or neck portion of the stay between said tongues being crimped, respectively, in opposite directions and to the same extent, whereby the shortening of the tongues is equal to the shortening of the neck portion, and hence of the recesses from which the tongues were struck, and therefore when the tongues are folded to bring their extremities into the plane of the stay they are approximately in contact with the shoulders at the lower extremities of the recesses, and are thereby protected.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

The herein-described cross-sectionally flat metallic fence-stay for connecting runners, the same being provided at intervals with runner-locks, each consisting of parallel lateral tongues 3 upstruck from the body of the

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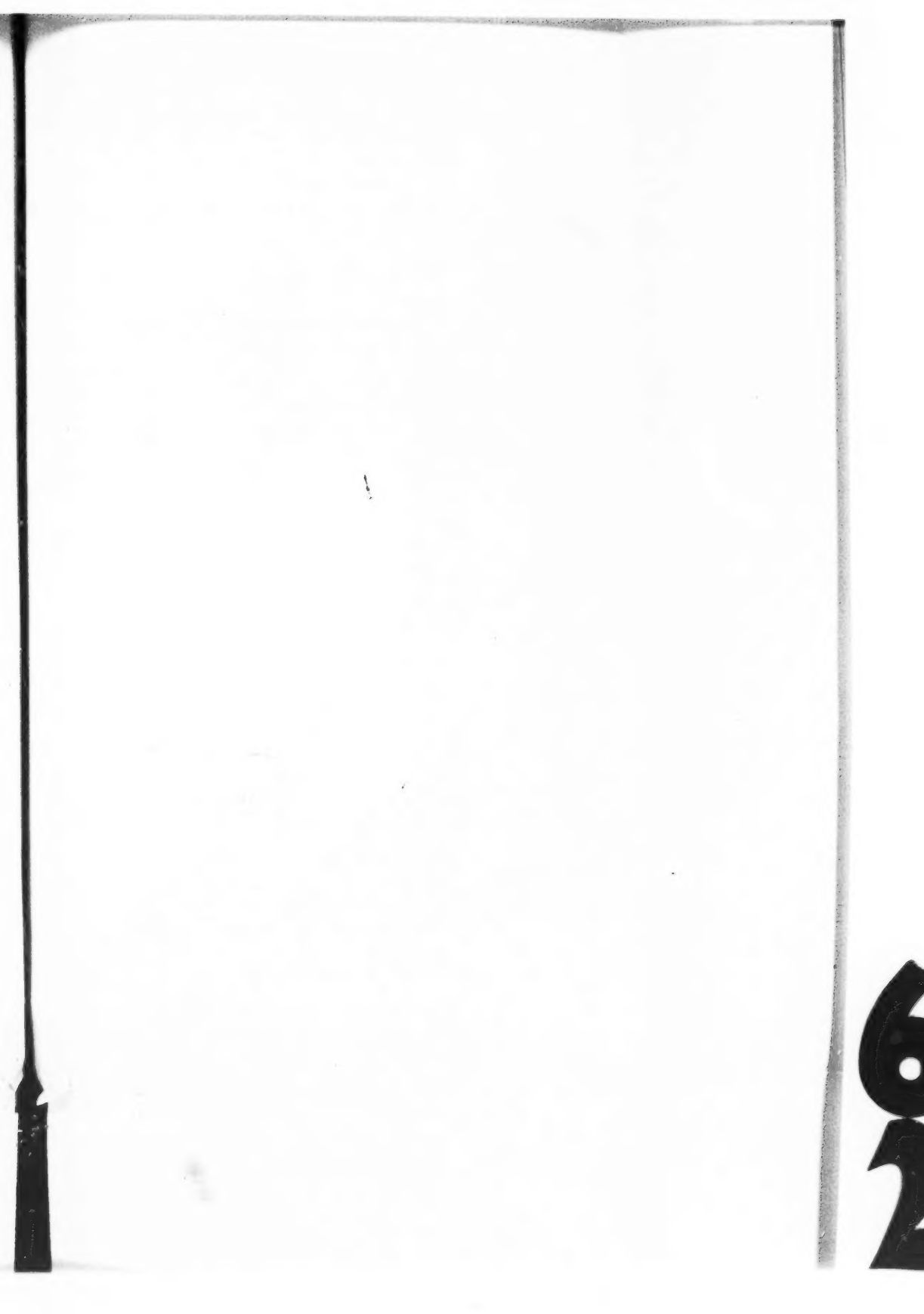
stay at its edges, to form side recesses and an intermediate reduced or neck portion, and said tongues and reduced or neck portion being crimped or bowed respectively in opposite directions to equal extents to receive a runner therebetween, and the extremities of the tongues being pressed rearwardly into the plane of the body portion of the stay to fill the lower ends of the recesses and lie in contact with the shoulders at the lower extremities thereof, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ROBERT V. CLARK.

Witnesses:
H. J. WELLER,
JNO. B. SCHWARZ.



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No. 723,657. PATENTED MAR. 24, 1903.

S. L. EASON.

FENCE POST.

APPLICATION FILED SEPT. 13, 1902.

NO MODEL.

Fig. 1.

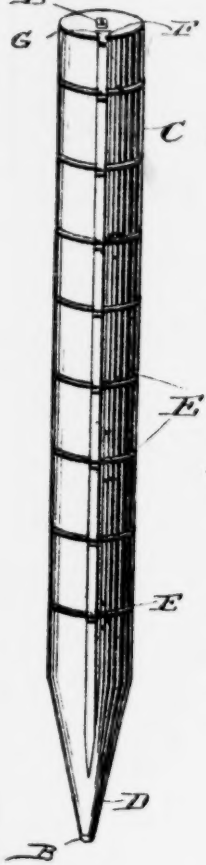


Fig. 2.

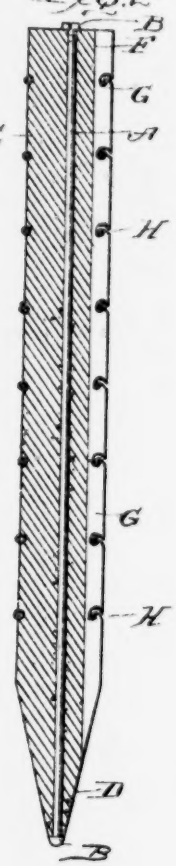


Fig. 4.

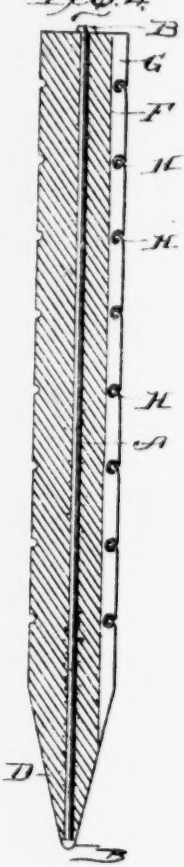
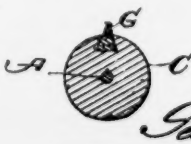


Fig. 3



Witnesses
J. M. Chandler Jr.
Mary E. Keene.

Samuel L. Eason
Inventor

Thos. P. Moore
Attorney

UNITED STATES PATENT OFFICE.

SAMUEL L. EASON, OF SCRANTON, IOWA, ASSIGNOR OF ONE-HALF TO SILAS G. KIONS, OF SCRANTON, IOWA.

FENCE-POST.

SPECIFICATION forming part of Letters Patent No. 723,657, dated March 24, 1903.

Application filed September 12, 1902. Serial No. 123,083. (No model.)

To all whom it may concern.

Be it known that I, SAMUEL L. EASON, a citizen of the United States, residing at Scranton, in the county of Greene and State of Iowa, have invented certain new and useful Improvements in Fence-Posts, of which the following is a specification.

My invention relates to improvements in fence-posts; and the object of my invention is the production of a fence-post which will be indestructible, attractive in appearance, thoroughly efficient, and inexpensive of production, thus insuring a practical fence-post.

With this object in view my invention consists of a fence-post embodying novel features of construction and combination of parts, substantially as disclosed herein.

Figure 1 represents a perspective view of my fence-post. Fig. 2 represents a vertical sectional view with the wires shown in the strip and post. Fig. 3 represents a horizontal sectional view, and Fig. 4 represents a vertical sectional view.

A designates a vertical rod which forms the core or center of my fence-post, said bar having threaded ends to receive nuts B, which serve to sustain the body C of the fence-post, said body being of cylindrical shape with the lower tapering end D to facilitate insertion or driving of the post into the ground. The body of the post is preferably made of cement and is formed with a series of grooves or depressions E, the purpose of which is to receive wires for binding the horizontal line-wires of the fence, and the body is formed on one side with an angular vertical channel F, which receives the strip G, which may be made of wood and to which the horizontal line-wires are secured by means of staples, as will be apparent, or the vertical strip may be made of metal and formed with a series of kerfs or seats H, which receive and hold the line-wires in place.

From the foregoing description and drawings it is evident that I provide a fence-post which is inexpensive of production and very durable and which is thoroughly efficient and practical.

I claim—

The fence-post herein shown and described, consisting of the central rod or core having a nut on its upper end and a tapering head on its lower end to enable the post to be easily driven, a plastic body surrounding the rod and having a vertical channel in one side, a series of parallel transverse grooves around the body and a tapering lower end and a strip fitting in the channel of the body having kerfs to receive the line-wires.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL L. EASON.

Witnesses:
ALLEN GLENN,
P. P. PITCHER.

No. 752,523. PATENTED FEB. 16, 1904.

A. G. CONSIDERE.

ARMED OR STIFFENED CONCRETE CONSTRUCTION.

APPLICATION FILED JUNE 27, 1902.

NO MODEL.

Fig. 1.

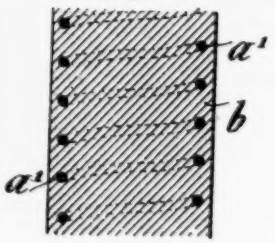


Fig. 3.

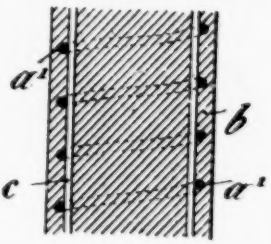


Fig. 2.

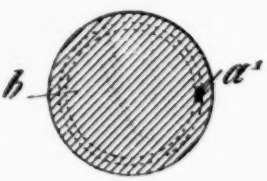


Fig. 4.

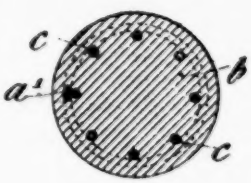


Fig. 5.

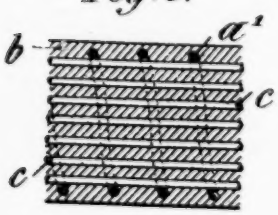


Fig. 6.

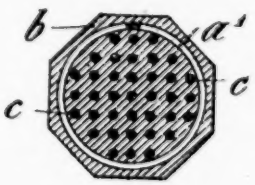
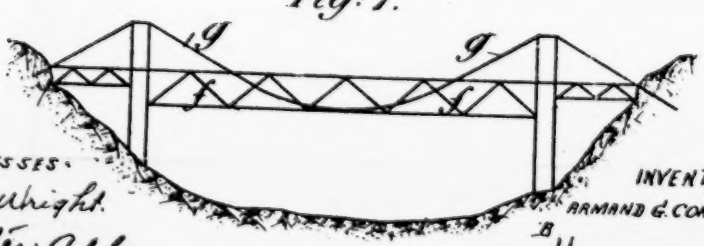


Fig. 7.



WITNESSES.
P. W. Wright.
Waller Abbe

INVENTOR
ARMAND G. CONSIDERE
By Howson and Howson
HIS ATTORNEYS.

No. 752,523. Patented February 16, 1904

UNITED STATES PATENT OFFICE.

ARMAND GABRIEL CONSIDERE, OF PARIS, FRANCE

ARMED OR STIFFENED CONCRETE CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 752,523, dated February 16, 1904.

Application filed June 27, 1902. Serial No. 113,467. (No model.)

To all whom it may concern:

Be it known that I, ARMAND GABRIEL CONSIDERE, a citizen of the Republic of France, residing in Paris, France, have invented certain new and useful Improvements in Armed or Stiffened Concrete Constructions, of which the following is a specification.

This invention has for its object to produce concrete or cement columns or the like structures which in service are adapted to withstand great compression or tension strains in a longitudinal direction. This object is secured by embedding strengthening-wires in helicoidal coils around a solid concrete core and covering the coils to protect them from the atmosphere.

In the accompanying drawings, Figure 1 is a longitudinal section of part of a column constructed to sustain longitudinal pressure. Fig. 2 is a cross-section of the same. Fig. 3 is a view similar to Fig. 1 of a modification with longitudinal strengthening-rods. Fig. 4 is a cross-section of the same. Fig. 5 is a longitudinal section, and Fig. 6 is a cross-section of a column with a greater number of longitudinal rods and which is to sustain longitudinal tension. Fig. 7 is a side view showing a means for tensioning the longitudinal rods before applying the concrete.

As shown in Figs. 1, 3, and 5, a helicoidal coil of metal *a'* is embedded in a solid core *b* of concrete or cement, so as to embrace the greater part of the solid core, but sufficiently below the surface to be protected from the atmosphere by the outer covering.

In Figs. 3, 4, 5, and 6 besides the helicoidal coils the core is provided with a number of longitudinal metal rods *c*. The object of thus encircling the solid core with the helicoidal coils *a'* of metal is to overcome the tendency of the concrete column when placed under compression strain longitudinally from breaking by lateral expansion of the column later. These helicoidal coils thus greatly increase the strength of a concrete column. It also has been found that when such column has been collapsed by excessive pressure under test warning is given for quite a time before rupture.

Tensional strains in my improved columns or cables are met by providing within the coils *a'* many longitudinal rods *c*, as shown particularly in Figs. 5 and 6.

In Fig. 7 I have represented a practical construction for carrying into effect a method of giving a preliminary tension to the longitudinal wires *c*. They are suspended like an ordinary cable, and I hang a foot-bridge or other temporary structure on them to cause them to take up the curve or other shape that the resulting bridge may require, and I then apply the helicoidal coils and concrete to these cables. By this means rupture of the concrete when the finished tension members are put under tension in use will be avoided.

I am aware that it has previously been proposed to embed in concrete pipes rings of metal; but these structures are hollow and for that reason are not adapted to stand compression or tension strains in a longitudinal direction to which my solid columns or cables are to be subjected.

I am aware of British Patents No. 1,715 of 1874 and No. 14,559 of 1885, showing skeletons of iron made with spiral coils riveted to each other or to longitudinal rods to carry concrete; but in my beams the concrete forms the essential basis of the column and my coils are independent—that is, not connected to the other coils or to longitudinal rods in the concrete.

I claim as my invention—

1. A column or the like of concrete, comprising a solid concrete core with independent helicoidal coils of metal surrounding said core, and arranged very close together, substantially as described.

2. A column or the like of concrete, comprising a solid concrete core with independent helicoidal coils of metal surrounding said core, and arranged very close together, and a covering for the coils, substantially as described.

3. A column or the like of concrete, comprising a solid concrete core, longitudinal rods within the core and independent helicoidal coils of metal arranged very close together and surrounding the core and rods, substantially as described.

4. A column or the like of concrete, comprising a solid concrete core, longitudinal rods

within the core and independent helicoidal coils of metal arranged very close together and surrounding the core and rods, and a covering for the coils, substantially as described.

5. A concrete construction, comprising longitudinal metal rods tensioned in the shape they are to maintain, and a concrete covering for said rods to make a solid core, and independent helicoidal coils arranged very close together, surrounded and retaining the core, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARMAND GABRIEL CONSIDERE.

Witnesses:

LÉON FRANCKEN,

EDWARD P. MACLEAN.

No. 756,471. PATENTED APR. 5, 1904.

J. D. CAREY.

CONSTRUCTION OF JOISTS, GIRDERS, OR THE LIKE.

APPLICATION FILED NOV. 11, 1903.

NO MODEL.

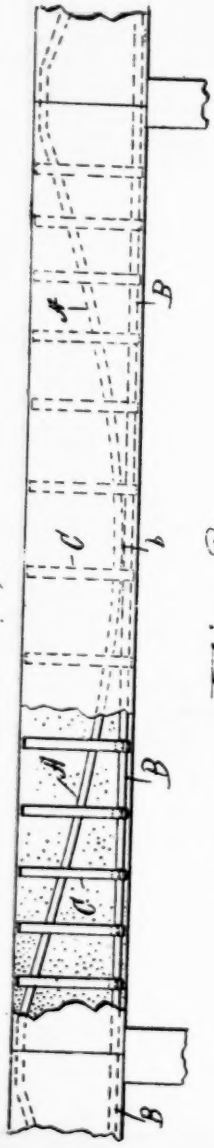


Fig. 1.

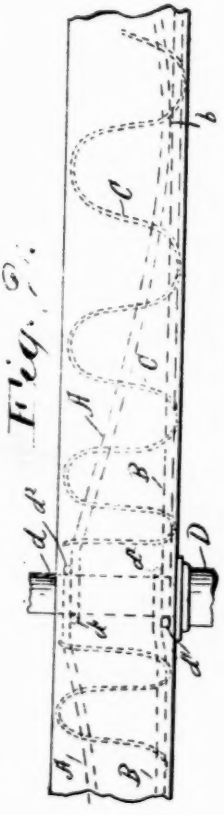


Fig. 2.

Fig. 3.

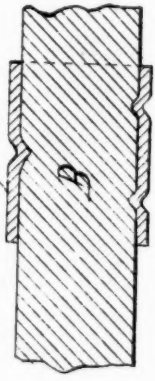


Fig. 4.

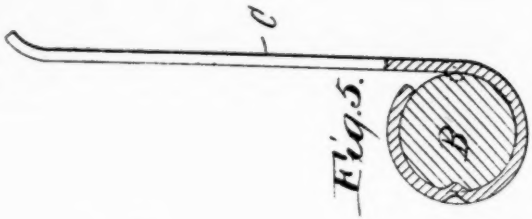


Fig. 5.

Witnesses.
E. B. Gilchrist
E. B. Donnelly

Inventor.
James D. Carey
by
W. E. Donnelly
his Atty

No. 756,471. Patented April 5, 1904.

UNITED STATES PATENT OFFICE.

JAMES D. CAREY, OF CLEVELAND, OHIO.

CONSTRUCTION OF JOISTS, GIRDERS, OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 756,471, dated April 5, 1904.

Application filed November 11, 1903. Serial No. 180,721. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. CAREY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Construction of Joists, Girders, or the Like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to building construction wherein beton or cement form the base of the structure, the same being interwoven with metallic struts, braces, tie-rods, or strengthening elements arranged in predetermined order.

The objects of the invention are to attain the best results by the peculiar formation of what are called the "suspension-rods" and in connection with this a peculiar arrangement of stirrup-pieces or tie-pieces arranged vertically and extending from the chords into the body of the cement and in juxtaposition to the brace-rods.

Still another object of this invention is to adapt the structure to the use of the same in connection with supporting-pillars, whereby both the chords and the suspension-rods are caused to embrace the upper end of the pillars, bringing the strain upon the same in opposite directions.

Other objects of this invention will appear and be apparent in the drawings and specification.

This invention consists in the peculiar arrangement and structural features as a whole and which will be hereinafter fully set forth and claimed.

In the drawings, Figure 1 illustrates a joist or girder constructed of beton and illustrating the arrangement of suspension and chord rod and stirrup-pieces. Fig. 2 illustrates in side elevation the joist or girder construction employed in connection with a supporting-pillar, illustrating the upper end of said pillar extending through the joist or girder to receive the lower end of a pillar to be supported above it. This figure illustrates in modified construction a tie or lateral supporting element composed of spirally-arranged heavy wires and also illustrates the manner in which the suspension-rods and chords embrace the upper end of the pillar. Fig. 3 is a plan view of a portion of Fig. 2, more clearly showing the manner in which the suspension-rods and chords surround the upper end of the pillar. Figs. 4 and 5 represent in section, longitudinal and cross, the manner of securing the stirrup-pieces to the chord-rods.

The manner of forming the girders or joists is the usual process employed in beton structures, and it is with the arrangement of the metallic element and their structural features that this invention refers. These are composed of suspension-rods A, which extend from wall to wall, pier to pier, or pillar to pillar, the same in cases where pillars are not used extending a short distance beyond the supporting parts and into the next structure, as is usual. However, in structures of this type heretofore made these suspension-rods have been so arranged and bent as that they run for a considerable distance parallel to or with the chord-rods B, and hence they were abruptly bent, forming sharp turns which strain the metal at these turning-points, decreasing its tensile value and also its value in resisting flexion, and this defect was located just at the portion needing the greatest strength of resistance.

In arranging my suspension-rods 1 gradually incline them toward the point central longitudinally of the beam, and preferably in a curved direction and causing them to meet the chord-rod B at the longitudinal center *b* of the joist, girder, or structure. Usually two of the suspension-rods are employed; but more may be used, if desired or found necessary, and the cross-section of the same is predetermined according to the necessary strength desired.

Another very essential feature of my construction, as illustrated in Figs. 4 and 5, is the construction of the stirrup-pieces and their attachment to the stirrup-rod. Heretofore these stirrup-pieces C have been loosely connected to the chord-rods and in some cases have been formed U-shaped, the chord-rod lying on the bottom of the stirrup and not always in close contact therewith, and thus

for instance, should the chord-rod be bent at any particular portion the stirrup-pieces would not come up to it, and when the cement was packed in the structure the cement would work between the under part of the chord-rod and the seat of the stirrup, and thus the stirrup would not support the chord-rod, and hence would detract from its value. Those familiar with structures of this nature will fully appreciate this objection where loosely-arranged stirrups are employed.

By my arrangement as illustrated in Figs. 4 and 5 the stirrup-pieces are located on the chord-rod and are pressed thereto and caused to positively engage the same at the lower end. Thus the disposing of the stirrups is predetermined positive and not left to or liable to be disarranged by the unskilled laborer employed in filling or tamping the beton.

As illustrated in Figs. 2 and 3 of the drawings, instead of using stirrup-pieces a continuous rod arranged so as to brace the chord-rods and the suspension-pieces may be employed. These figures also illustrate the manner in which the structure may be employed in connection with pillars D. In this case the suspension-rods A and chords B are caused to embrace the upper end of the column or pillar D at its impost portion, thus bringing the strain in both directions and in opposite directions, as at d' d^2, when the pillars are employed and allowing the pillar to pass through the structure to receive a superimposed pillar.

By disposing the metal as above described I attain great strength of structure, economy and positiveness in arrangement of the metallic element, and convenience in assembling the structure as a whole, as it will be seen that the elements of metal may be prearranged with their coacting parts previous to locating them and filling in the cement or beton.

In setting forth this invention I have called attention to particular arrangements and structural features of element, but do not wish to be limited to the same as they are described or set forth.

What I claim is—

1. In a combined cement and metallic structure, the combination with a chord member of a suspension member bent downwardly from each supporting portion of the structure to a point longitudinally central of the chord member meeting the chord member at said point, and vertically-disposed stirrup members supporting the chord member, and means integral with the said members adapted to positively engage the chord member to hold the stirrup members in fixed position, substantially as described.

2. In a combined beton and metallic structure, the combination with a chord member, of a curved suspension member which meets the first-named member at a point longitudinally central thereof, stirrup members secured to and supporting the chord member, and means formed integral with the stirrup members adapted to positively engage the chord member so as to retain said stirrup members in position.

3. In a combined cement and metallic structure, a chord member, a stirrup member supporting the same at one side thereof, and means formed integral with the stirrup member adapted to positively engage the chord member and retain the stirrup member in position, substantially as set forth.

4. In structures comprising combined cement and metal, the combination with a chord member, of a suspension member bent downwardly and meeting the chord member at a point longitudinally central thereof, a stirrup member supporting the chord member, and means formed integral with the stirrup member to retain the stirrup member in position, substantially as described.

Signed at Cleveland, in the county of Cuyahoga and State of Ohio, this 14th day of February, 1903.

JAMES D. CAREY.

Witnesses:
E. B. DONNELLY,
W. E. DONNELLY.

No. 766,899.

PATENTED AUG. 9, 1904.

F. POHLMANN.

CONCRETE OR LIKE GIRDER.

APPLICATION FILED JUNE 6, 1903.

NO MODEL.

Fig. 1.

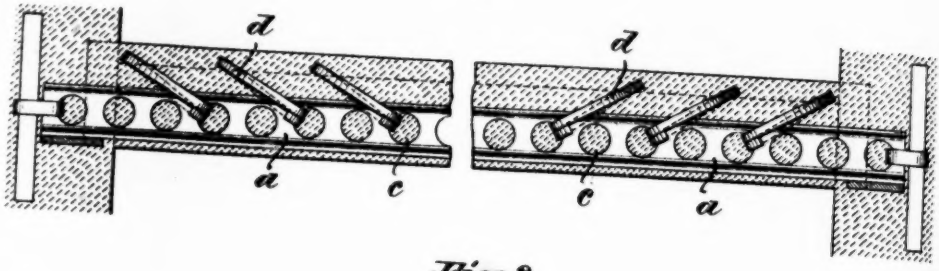


Fig. 2.

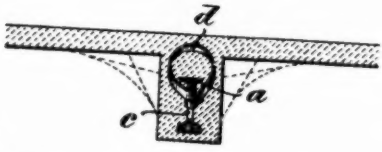


Fig. 3.

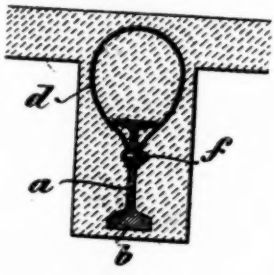


Fig. 4.

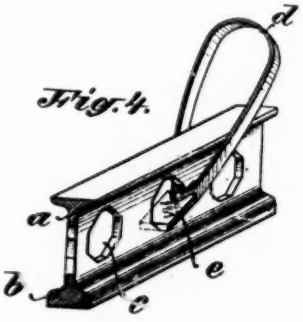


Fig. 5.

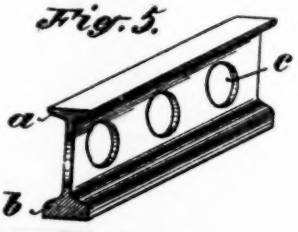
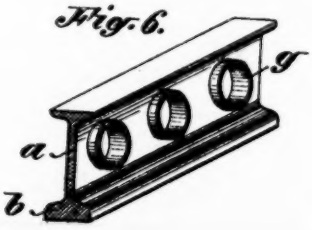


Fig. 6.



Witnesses:

E. W. Ladrick

H. H. Robbins

Inventor:

Fritz Pohlmann

by Marcellus Bailey

Atty

No. 766,899. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

FRITZ POHLMANN, OF SCHÖNEBERG-BERLIN, GERMANY.

CONCRETE OR LIKE GIRDER.

SPECIFICATION forming part of Letters Patent No. 766,899, dated August 9, 1904.

Application filed June 6, 1903. Serial No. 160,379. (No model.)

To all whom it may concern:

Be it known that I, FRITZ POHLMANN, a subject of the King of Prussia, residing at No. 37 Hohenstaufenstrasse, Schöneberg-Berlin, Kingdom of Prussia, German Empire, have invented new and useful Improvements in Concrete or Similar Girders, of which the following is a specification.

This invention relates to a new construction of concrete girder by means of which a considerable saving in iron can be effected by statically utilizing the filling material forming the connection between the ceilings and the girder.

In the accompanying drawings, Figure 1 is a longitudinal section, partly in elevation, of a concrete girder constructed in accordance with this invention. Fig. 2 is a transverse section of the same. Fig. 3 is a sectional view of the iron girder and loop. Fig. 4 is a similar view of a perforated iron girder and loop. Fig. 5 is a perspective view of the perforated iron girder. Fig. 6 is a perspective view of the iron girder with flanged holes.

Like letters indicate like parts throughout the drawings.

The upper iron flange and the upper half of an ordinary I-girder *a* is partly replaced by concrete material. A similar construction is known in armored concrete girders, where the lower flange of the girder is replaced by bar (round or square) iron surrounded by concrete; but in that case there is the drawback that the iron armor in itself before the stone or concrete material has been added has little or no stability. This drawback is obviated in the present invention by using strong rolled-iron beams *b* for the part exposed to tensile stress. Its bending strength is calculated to be sufficient for supporting the weight of the wooden binding-joists required for making the ceiling and the weight of the stone or concrete itself. In this way there is no necessity for supporting the binding-joists by scaffolding, and said binding-joists can be attached direct to the iron part in the same way as for ordinary girders, besides which the ceilings need not be made until after the roof has been completed, as the iron part of the girder sufficiently strengthens the walls. In order to make the iron part of suitable shape for its action in the stone, the mass of metal is concentrated at the part *b* subjected to the greatest stress. The cross-section is therefore unsymmetrical relatively to the horizontal axis, and the tensile stress produced in the concrete girder is taken up by the lower thickened flange *b* of the iron girder. The sheering stress acting on the concrete girder is taken up by connecting the iron part with the stone or concrete material in the best possible way. This connection is effected partly by the adhesion of iron and concrete and partly by mechanical means.

The iron part is provided throughout the whole of its length with holes *c*, arranged at small intervals and of such height as to occupy nearly the whole height of the web. When embedded in the concrete, the filled holes transmit the sheering stress produced by the tensile strains on the perforations of the iron, acting as stone rivets. In order to obtain a greater bearing-surface in the perforated girders, the holes can be provided with flanges *g*, Fig. 6.

For increasing the resistance against tensile stress metal bands or loops *d* may be attached near the ends of the iron girders by screws *f*, rivets, or the like, or they may be passed through the holes *c*, Figs. 1, 3, and 4, and secured in their position by wedges or stays *e*, Fig. 4.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In a concrete girder the combination with the concrete material, of a metal beam having an upper flange and a lower flange of greater thickness than the upper flange and a web provided with perforations extending from near the lower flange to near the upper flange.

2. In a concrete girder the combination with the concrete material, of a metal beam having an upper flange and a lower flange of greater thickness than the upper flange and a web provided with flanged perforations extending from near the lower flange to near the upper flange.

3. In a concrete or similar girder in combination with the concrete material of a metal

beam having a lower thickened flange and web with metal bands or loops attached thereto, substantially as and for the purpose stated.

4. In a concrete or similar girder the combination, of the concrete material with a metal beam having a lower thickened flange, web provided with holes, and metal bands or loops secured in said holes, substantially as and for the purpose stated.

5. In a concrete or similar girder the combination, of the concrete material with a metal beam having a lower thickened flange, web provided with holes, and metal bands or loops passed through the holes and secured in their position by wedges or stays, substantially as and for the purpose stated.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRITZ POHLMANN.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.

No. 768,284. PATENTED AUG. 23, 1904.

J. KAHN.

COMBINED STEEL AND CONCRETE BEAM.

APPLICATION FILED JAN. 20, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

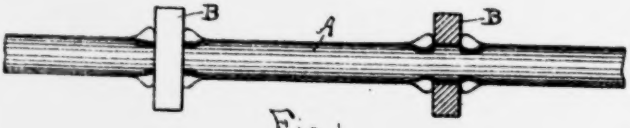


Fig. 1.

Fig. 8.

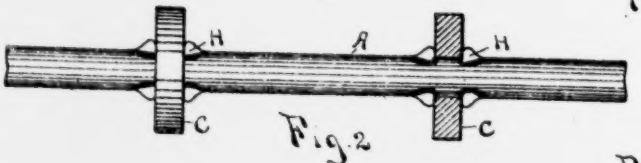


Fig. 2.

Fig. 9.

Fig. 3.

Fig. 10.

Fig. 4.

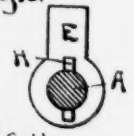


Fig. 11.

Fig. 5.

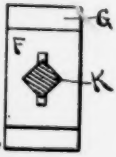


Fig. 12.

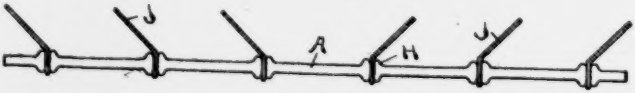


Fig. 6.

Fig. 13.

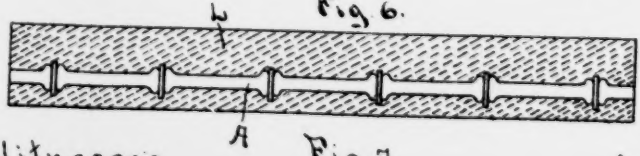


Fig. 7.

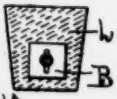


Fig. 14.

Witnesses.
Geo. W. Barnes.
A. E. Wilcox

Inventor.
Julius Kahn.
by Edward N. Pagelsen.
his Attorney.

No. 768,284. PATENTED AUG. 23, 1904.

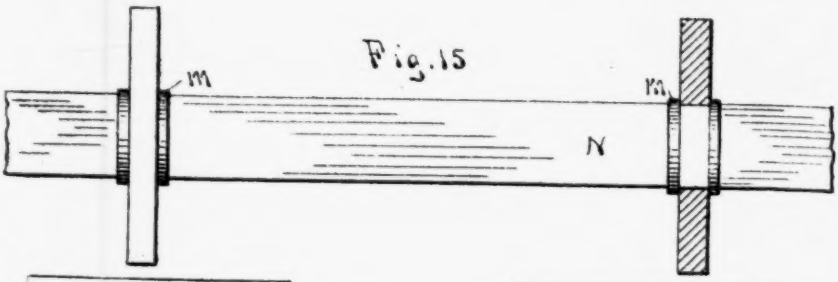
J. KAHN.

COMBINED STEEL AND CONCRETE BEAM.

APPLICATION FILED JAN. 20, 1904.

NO MODEL. 2 SHEETS—SHEET 2

Fig. 15



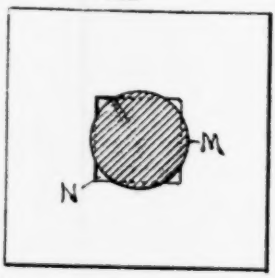


Fig. 16.

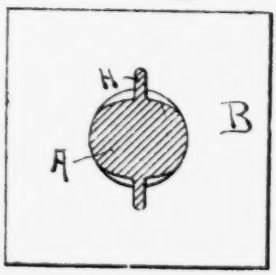


Fig. 18.

Fig. 17.

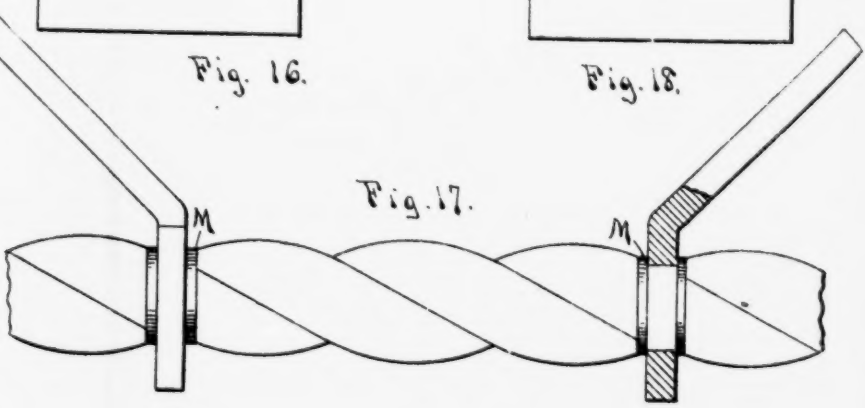
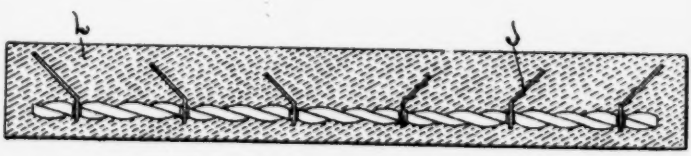


Fig. 19.



Witnesses.
A. D. Wilcox
Harold Ott

Inventor.
Julius Kahn
by Edward N. Pageler
his Attorney.

No. 768,284. Patented August 23, 1904.

UNITED STATES PATENT OFFICE.

JULIUS KAHN, OF DETROIT, MICHIGAN.

COMBINED STEEL AND CONCRETE BEAM.

SPECIFICATION forming part of Letters Patent No. 768,284, dated August 23, 1904.

Application filed January 20, 1904. Serial No. 189,798. (No model.)

To all whom it may concern:

Be it known that I, JULIUS KAHN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Combined Steel and Concrete Beam, of which the following is a specification.

This invention relates to a combined steel and concrete beam, and has for its object to provide for a longitudinal tension member for said beam supplemented with washers or deformations to insure better contact with the concrete body and to prevent stripping.

A further object of my invention is to construct the main tension-bar of uniform cross-sections in order that there may be no waste of material and to enable the use of a greater or less number of washers, as may be desired.

These objects I attain by the construction and arrangement of the parts, as illustrated in the drawings, and set forth in the description and claims.

In the accompanying drawings, Figures 1, 2, 3, 4, and 6 are views of a bar constructed in accordance with my invention, having washers of different forms. Fig. 5 shows a tension member in the form of a twisted square bar. Fig. 7 is a longitudinal section of the beam with the tension member in position. Figs. 8 to 13, inclusive, are cross-sections of the tension members shown in Figs. 1 to 6, inclusive, respectively. Fig. 14 is a cross-section of the beam shown in Fig. 7. Fig. 15 shows a square bar molded to give a round cross-section on each side of the washers. Fig. 16 is a cross-section through the alteration. Fig. 17 is a similar bar twisted. Fig. 18 is an enlarged cross-section through the alteration of the bar shown in Fig. 1. Fig. 19 shows a beam with the tension member of Fig. 17 in position.

Similar reference characters refer to like parts throughout the several views.

A is the main longitudinal bar, of round steel or similar material capable of resisting tension stresses. This bar is provided at points intermediate its ends with the washers B, which may be used in any desired number and placed at any desired distance apart, either uniformly spaced or preferably closer together at the ends of the bars. These washers B, as shown in Figs. 8 and 18, are square, with a circular opening in the center to fit on the bar A, which will also be circular in cross-section. After the washers have been placed on the bar an upsetting, distortion, or deformation of said bar (indicated by H) is made on either side of the washers for the purpose of holding them securely in position by placing the bar between two pairs of dies, the washer being between the pairs. When the dies are closed, a portion of the bar is squeezed out radially, so as to form a lug or ear H on each side of the washer, thereby rigidly securing the washer in place on the bar without reducing the cross-sectional area. These lugs are preferably formed in pairs, one on either side of the bar. The washers may be of any shape or size, as shown in the various figures, depending upon the shape and load of the beam.

Where square bars are used, either straight or twisted, I prefer to change the cross-section at the point of alteration of the cross-section from square to round, as shown in Figs. 15, 16, and 17, which may be done by using cylindrical dies. The diameter of a circle of unit area is 1.13, so that four strong lugs or shoulders M will be formed on the bar N on either side of the washers. The bar may be twisted either before or after the alteration of the cross-section; but I prefer to twist the bar after the washers are secured in place.

As shown in Fig. 5, the bar K is provided with spiral corrugations, which greatly increase the adhesion of the concrete. The washers in this figure are represented of varying sizes, smaller at the middle of the bar and increasing in size as they approach the ends. For the purpose of serving as binders for the concrete these washers would preferably be made rectangular or oblong and the greater length placed in a vertical line of the beam L. They may extend perpendicularly to the main longitudinal beam or may be inclined obliquely thereto, as represented in Figs. 6 and 17. In this modification the washers best perform the function of binding the concrete against shearing stresses and at the same time prevent the bar from stripping. It is

not necessary that these washers shall be of great weight or strength, but are preferably constructed of a comparatively light material.

The adhesion of concrete to a plain bar is considerable, but not sufficient in all cases to make a beam of symmetrical strength—that is, one in which the adhesion of the concrete necessary to prevent stripping will equal the tensile strength of the longitudinal metal bar. By the use of my invention these factors may be provided for as particular cases demand and the highest efficiency obtained by the reinforcement.

To form the beam, the tension-bar is suspended or otherwise supported in and near the bottom of the mold and concrete rammed around it, which when setting unites with the tension member, forming a beam of great strength, the tension member being below the neutral axis of the beam.

Having now explained my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a metal reinforcement for concrete, the combination of a tension member, of a plurality of metal blocks or washers placed upon the member at points intermediate its ends, said washers having arms projecting laterally from one side of the member, the cross-section of said member being changed to form shoulders for the support of said blocks.

2. In a beam, the combination of a tension member of uniform cross-section and uniformly twisted, of a plurality of auxiliary pieces placed upon said member at points intermediate its ends and inclined in opposite directions from the center and secured in position by deformations of said member on the opposite sides thereof, and a beam of plastic material surrounding said member.

3. In a beam, the combination of a longitudinally-disposed tension member, of auxiliary pieces placed upon said member at points intermediate its ends and secured in position by deformation of the member without varying its cross-sectional area, and a beam of plastic material surrounding said tension member, the tension member being below the neutral axis of the beam.

4. In a metallic reinforcement for concrete, the combination of a metallic bar longitudinally disposed, of auxiliary perforated members strung upon the bar and secured in place, said auxiliary members being inclined in opposite directions from the middle of said bar.

5. In a metallic reinforcement for concrete, the combination of a bar, rectangular in cross-section, and washers on said bar having rectangular openings, said bar being molded to circular cross-sections to form shoulders to support said washers.

6. In a metallic reinforcement for concrete, the combination of a twisted bar, rectangular in cross-section, and washers on said bar, said bar being molded to circular cross-section to form shoulders to support said washers.

7. In a metallic reinforcement for concrete, the combination of a bar, rectangular in cross-section, and washers on said bar having rectangular openings and being inclined in opposite directions from the middle of said bar, said bar being molded to circular cross-sections to form supporting-shoulders on each side of said washers.

8. In a metal reinforcement for concrete, the combination of a tension member, of a plurality of metal blocks or washers placed upon the member, at points intermediate its ends, and of a deformation of said member without varying its cross-sectional area whereby a shoulder is given for the support of said blocks.

9. In a reinforcement for concrete or similar material, the combination of a longitudinal bar of uniform cross-section, of a plurality of washers placed upon said bar at points intermediate its ends, and secured against longitudinal movement by deformations of the bar to form shoulders on opposite sides of the washers which distortions do not vary the cross-sectional area of the bar.

10. In a metal reinforcement for concrete, the combination of a tension member, of a plurality of auxiliary members placed upon the tension member intermediate its ends, said auxiliary members having arms projecting laterally from one side, the cross-section of said tension member being changed to form shoulders for the support of said auxiliary members.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JULIUS KAHN.

Witnesses:
EDWARD N. PAGELSEN,
MAURICE GOLDENBERG.

No. 805,663.

PATENTED NOV. 28, 1905.

G. L. PEABODY.

REINFORCING DEVICE FOR CONCRETE CONSTRUCTION.

APPLICATION FILED SEPT 29, 1904.

Fig. 1.

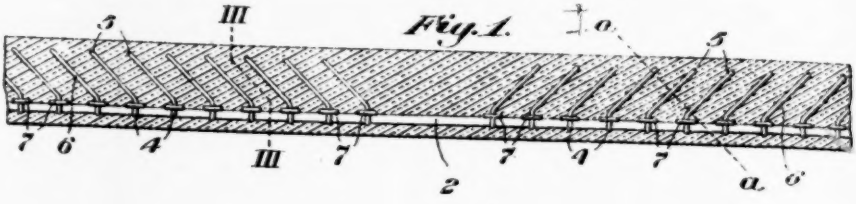


Fig. 2.

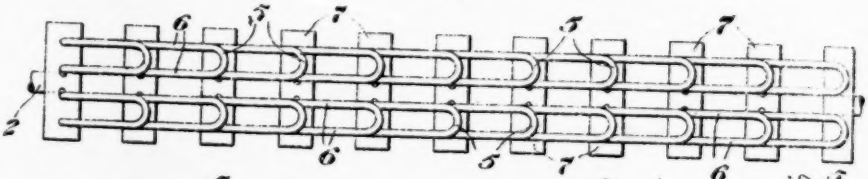


Fig. 3.

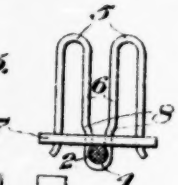


Fig. 4.

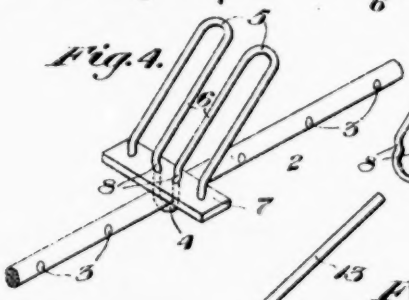


Fig. 5.

Fig. 8.

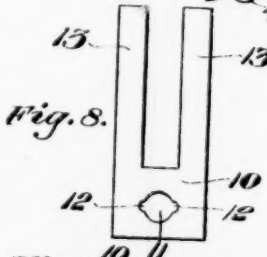


Fig. 6.

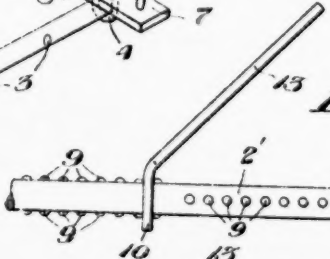


Fig. 9.

Fig. 7.

Fig. 10.

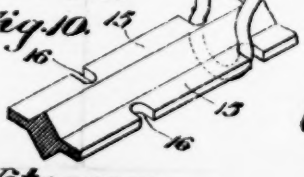


Fig. 11.

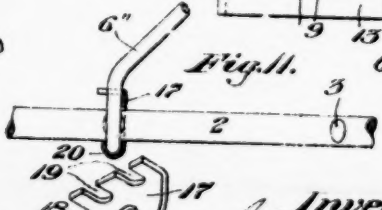



Fig. 12.

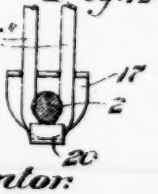


Fig. 13.

Witnesses:

A. H. King

Chas. S. Fepley

Inventor:

George L. Peabody

by C. M. Clarke

his Attorney

UNITED STATES PATENT OFFICE.

GEORGE L. PEABODY, OF PITTSBURG, PENNSYLVANIA.

REINFORCING DEVICE FOR CONCRETE CONSTRUCTION.

No. 805,663. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed September 29, 1904. Serial No. 226,526.

To all whom it may concern:

Be it known that I, GEORGE L. PEABODY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Reinforcing Devices for Concrete Constructions, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of the specification, in which—

Figure 1 is a view in side elevation of a portion of concrete construction provided with my improved reinforcing device. Fig. 2 is a plan view, on an enlarged scale, of one end of the device. Fig. 3 is a vertical cross-sectional view on the line III III of Fig. 1. Fig. 4 is a perspective view of the portion of the bar with one of the anchoring devices attached thereto. Fig. 5 is a modified form of holding-arm. Fig. 6 illustrates in side elevation a modified construction. Fig. 7 is a plan view of Fig. 6. Fig. 8 is an end view. Fig. 9 is a detail view showing the bar pinched around the plate. Fig. 10 is a detail view showing a different form of bar. Figs. 11 and 12 show a modified construction employing a supplemental holding-clip. Fig. 13 is a detail view showing the clip detached.

My invention relates to improvements in devices for incorporation with concrete structures—as bridges, beams, girders, walls, ceilings, floors, columns, &c.; and it has for its object to strengthen and reinforce the concrete body portion constituting the floor, &c., embedded therein and provided with projecting arms or branches arranged at any angle desired and so constructed as to be adjusted to suit the requirements of use and to make and maintain a strong binding hold in the cement or concrete at closely-adjacent intervals.

The invention is designed to provide a reinforcing device which will be capable of incorporation with the concrete in such a manner as to traverse the lines of probable fracture and counteract such fracture in the best possible manner, the device being provided with a closely-adjacent plurality of such arms or with arms or branches which may be adjusted to the intervals desired or required by the work in view.

Referring now to the drawings, 2 represents the main element of the device consisting of a bar of metal of any suitable cross-section, but preferably cylindrical. The bar is provided at intervals with notches or grooves 3 on opposite sides, around which are passed the looped portion 4 of the arms, which are then extended upwardly beyond the bar 2 and bent at any desired angle and looped, as at 5. The arms are made of a heavy wire or rod 6 and may be then turned backwardly, as shown in the principal figures of the drawings, and their terminal portions connected in a cross bar or clamp 7 of any suitable construction, by which the entire arm may be tightly secured in position and to the bar 2. For the purpose of insuring the gripping action of the arms upon the bar they may be abruptly bent, as at 8, thereby forming a shoulder on the upper side of bar 7, so as to prevent their loosening or removal, and as thus constructed the arms will be rigidly attached to the main bar. It will be seen that the arms may be closely assembled, as indicated in Figs. 1 and 2, and that as thus located they cross the line of fracture, as *a a*, at least three times, thereby providing strong counteracting reinforcing devices, which effectually perform their functions. It is designed that the arms may be incorporated with the main bar at the place where used—as, for instance, in a building under construction—which feature greatly facilitates the shipment and handling of the different parts, their assemblage being a matter of simple and easy accomplishment by any mechanic.

It will be understood that any suitable device may be used for the arms, and in Figs. 6, 7, and 8 I have shown a bar 2', provided with series of abutments 9, located in oppositely-arranged series of rows with an intervening space between the abutments for the insertion of a holding-arm of the character shown in these figures, made of a plate of sheet metal 10, having an aperture 11 for the bar and registering openings or slots 12 to facilitate its insertion upon the bar, the plate being provided with one or more upwardly-bent projections 13, arranged at any suitable or desired angle, as already described.

In Fig. 9 the bar 2'' is originally smooth on its exterior, the plate 10 or any other suitable branch device being provided with a corresponding aperture slipped over the bar and secured thereon by holding-lugs 14, pinched or upset from the metal of the bar, so as to securely bind on each side of the plate and hold it in position, the plates being thus attached at any desired interval apart.

In Fig. 10 the bar is shown as provided with lateral flanges 15 15, having notches or apertures 16 at the desired distances apart,

which engage the arms 6′, as shown, the arms being tightened or fastened upon the bar in any suitable manner.

In Figs. 11 and 12 the bar is provided with the notches 3, already described, the arm extremities 6″ being attached in the manner shown, and are further secured by a supplemental clip 17, consisting of a plate of sheet metal having an opening 18 for the bar and apertures 19 in its upper edge, which edge may be bent over, the clip being provided with a terminal tongue 20, which is bent up around the lower portion of the arms, as shown, thereby securely attaching it to the main bar.

All of these various devices are suitable for the objects in view and provide a main bar having rigidly-connected projecting arms capable of being bent to any desired angle and to maintain their position with relation to the bar, so as to transmit to it the various strains to which the concrete structure is subjected.

It will be understood that various other devices or constructions of holding-arms may be incorporated with the bar, and all such various changes or modifications which may be made by the skilled mechanic are to be considered as within the scope of the following claims, as I do not desire to be limited to the exact construction shown and described.

Having described my invention, what I claim is—

1. A reinforcing device for concrete, &c., consisting of a main bar provided with a series of notches, and holding-arms surrounding the bar in engagement with said notches and projecting laterally from the bar, substantially as set forth.

2. A reinforcing device for concrete, &c., consisting of a main bar provided with a series of notches, holding-arms surrounding the bar in engagement with said notches and projecting laterally from the bar, with securing devices for the arms, substantially as set forth.

3. The combination with a main bar provided with a series of notches formed between adjacent shoulders, of holding-arms surrounding the bar and in engagement with said shoulders, and provided with apertures adapted to provide clearance therefor in assembling the arms with the bar, substantially as set forth.

4. The combination with a main bar provided with a series of notches, of oppositely-disposed series of holding-arms surrounding the bar in engagement with said notches and projecting laterally from the bar and toward each end respectively beyond its middle portion, substantially as set forth.

5. A reinforcing device for concrete, &c., consisting of a main bar provided with a series of notches, and holding-arms surrounding the bar in engagement with said notches and projecting upwardly and outwardly toward the ends of the bar, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE L. PEABODY.

Witnesses:
R. H. McLAREN,
C. M. CLARKE.

No. 815,157. PATENTED MAR. 13, 1906.

J. F. GOLDING.

TENSION BAR FOR USE IN CONCRETE AND THE LIKE.

APPLICATION FILED FEB. 20, 1905.

Fig. 1.

Fig. 2.

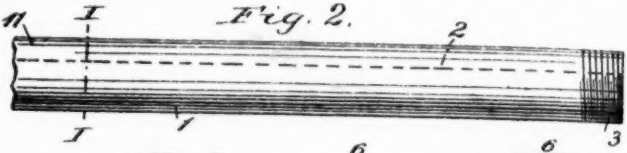


Fig. 3.

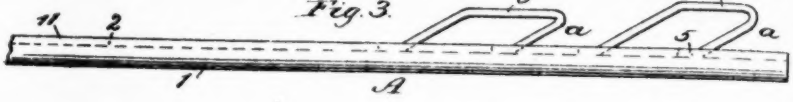


Fig. 4.

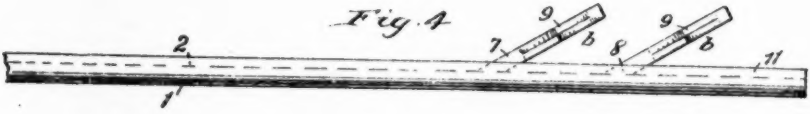


Fig. 5.

Fig. 7.

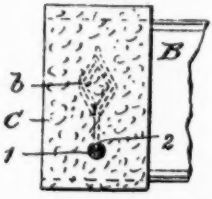


Fig. 10.

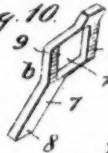


Fig. 6.

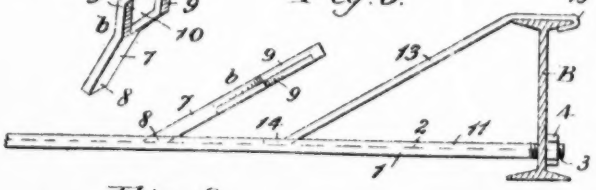


Fig. 8.

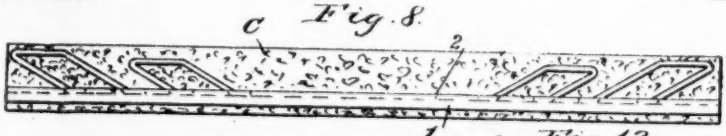


Fig. 9.

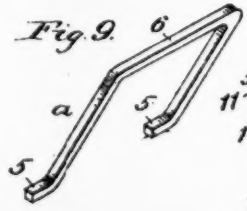


Fig. 11.

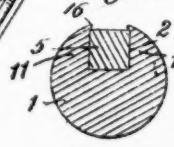


Fig. 12.

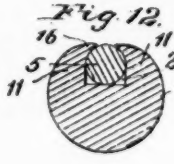
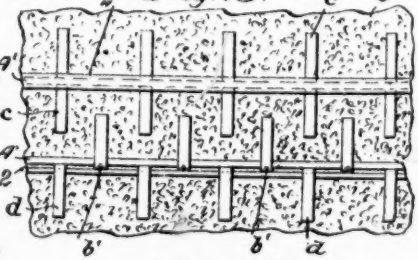


Fig. 13.



Witnesses:
J. S. Barker
Geo. B. Pettit.

Inventor:
John F. Golding
by H. N. Low
Atty.

UNITED STATES PATENT OFFICE.

JOHN F. GOLDING, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO MONOLITH STEEL COMPANY, INCORPORATED, A CORPORATION OF VIRGINIA.

TENSION-BAR FOR USE IN CONCRETE AND THE LIKE.

No. 815,157. Specification of Letters Patent. Patented March 13, 1906.

Application filed February 20, 1905. Serial No. 246,609.

To all whom it may concern:

Be it known that I, JOHN FRENCH GOLDING, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Tension-Bars for Use in Concrete and the Like, of which the following is a specification.

My invention relates to the strengthening of cement, concrete, and the like where these materials are employed in various structures, and it consists in a tension-bar adapted to be embedded in or surrounded by such materials, the bar comprising a main longitudinal member and inclined members provided with concrete engaging or locking portions which are so arranged as to obtain a positive hold upon the material at a distance from the bar as distinguished from a mere skin frictional engagement, whereby the cracking of the material is prevented when the structure is subjected to strain and the separation of the different parts of the body of material from each other or from the said main member is rendered impossible.

It further consists in a tension-bar of peculiar construction; also, in such a bar suitably embedded in concrete or the like; also, in the parts and combinations thereof hereinafter set forth and claimed.

In order to make the invention clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect without limiting my improvements in their useful applications to the precise constructions and arrangements which, for the sake of example, I have delineated.

In said drawings, Figure 1 is a sectional view of the main longitudinal member of a tension-bar embodying my invention on line I of Fig. 2. Fig. 2 is a side view of a portion of said main member. Fig. 3 is a side view, on a smaller scale, of a portion of my improved tension-bar, showing two of the inclined or supplemental members combined with the main longitudinal member. Fig. 4 is a similar view showing supplemental members of a different form also embodying the invention. Fig. 5 is a side view showing another form of supplemental member. Fig. 6 is a side view, partly in section, of a portion of the tension-bar united with one of the floor-beams. Fig. 7 is a sectional view at right angles to Fig. 6, showing also the body of concrete around the tension-bar. Fig. 8 is a vertical sectional view of a concrete floor or beam containing a tension-bar of the form shown in Fig. 3. Figs. 9 and 10 are perspective views of the supplemental members shown, respectively, in Figs 3 and 4. Figs. 11 and 12 are sectional views across the tension-bar at the point where it is united with a supplemental member, said views showing, respectively, a supplemental member of square cross-section and one of round cross-section. Fig. 13 is a plan view, partly in section, of a portion of a floor having tension-bars embodying my invention, in this instance the supplemental members extending horizontally on each side of the grooved member.

I have herein shown and described the tension-bar as combined in a floor; but it will be understood that the invention is not confined to use in such particular structure. The word "concrete" as used herein is intended to cover all built-up structures of similar or analogous materials.

Referring to the drawings, 1 indicates the main or longitudinal member of the tension-bar A, made of suitable material, such as iron or steel, to have the necessary tensile strength. The member 1 is rolled or otherwise formed with a longitudinal surface-groove 2, extending for a portion of or by preference for the entire length of the member and leaving a relatively heavy main body from and beyond which extend the opposing lips 11. When the bar A is combined in a floor, as shown in Figs. 7 and 8, the member 1 is laid substantially horizontally with the groove 2 on the upper side. The member 1 is or may be provided at its ends with screw-threads 3 and nuts 4, as indicated in Figs. 2 and 6.

In Fig. 3 the supplemental members are shown at *a* extending in an inclined direction upward and away from the member 1. They are provided with feet 5, securely held in the groove 2 and at a distance from the member 1, with concrete engaging or locking portions 6 arranged crosswise of or at an angle to the general direction of the supplemental member, so as to obtain a positive hold or lock on or in the concrete. Thus the portions 6 may be parallel with the member 1, as shown in Figs. 3, 5, and 8. In this particular construction of supplemental member (shown at *a*) it is formed of a bar of metal the middle of which

forms the engaging or locking part 6, the ends of which are legs extending in an inclined direction to the member 1 and the extremes of which constitute the feet 5. In order to effect the most economical distribution of metal, I usually pfefer to make the supplemental members progressively a little longer or higher as the end of the main bar is approached, as indicated in Figs. 3, 5, and 8.

Another form of supplemental member is shown in Figs. 4, 6, 7, and 10 at *b*, the same having a single leg 7 and foot 8. The concrete engaging or locking portions are formed by the limbs 9 of eyes or loops 10. The latter are of diamond or other suitable shape. The members shown at *b* are or may be short sections of the tension-bar which is the subject of my Patent No. 758,061, dated April 26, 1904. The legs of the supplemental members may extend at right angles to the bar 1 instead of being inclined, as seen in Fig. 5.

The tension-rod described is or may be delivered in a knockdown condition, the supplemental members separate from the main member 1. The parts are then assembled according to the requirements of the floor or other structure, the supplemental members being spaced apart or arranged as desired in the groove 2 of the member 1, and the feet of the supplemental members are secured by forcing inward the lips or parts 11, which extend outward from and beyond the main body of the member 1, with a suitable press or swage, so as to permanently set the metal of the member 1 against or onto the sides of the supplemental members. The tension-bar A may, however, be completed for use at the factory, in which case the parts may be permanently united by a rolling process, the bar with the supplemental members inserted in its groove being passed between grooved rollers suitably shaped to upset, bend, or compress the metal of the member 1, as desired.

The preferred manner of attaching the tension-bar to the supporting-beams is shown in Fig. 6, where one of such beams is indicated at B. The end of the member 1 is inserted through an aperture in the lower part of the vertical web of the beam, and the nut 4 is set up against the web. The other end of the member is similarly secured to another beam. 13 is a tie-rod having a foot 14 secured in the described manner in the groove 2 and which extends thence in an inclined direction to the top of the beam, where it is provided with a hook 15, which engages the top flange or other convenient part of the beam. The tie strengthens and supports the member 1, strengthens the concrete at one of its points most subject to heavy strain, and keeps the tension-bar A upright during building.

The supplemental members may be of square, round, or other cross-section. The thickness of the supplemental member or of its foot may be a little less than the depth of the groove 2, Figs. 11 and 12, in which case the edges of the groove are or may be bent partly over or around the foot of the supplemental member, as indicated at 16 in said figures.

C is a body of concrete representing a floor, beam, or other structural element. It incloses the bar A and enters the spaces between or within the supplemental members.

In Fig. 13 I have shown supplemental members consisting of plain straight bars secured in the grooved bars, as already described. In this construction the supplemental members are arranged horizontally. The bar shown at A′ has two of the described grooves opposite to each other, one on each side of the bar, and the supplemental members *c* are secured some in one groove and some in the other, extending in opposite directions from the grooved bar. The bar shown at A is similar to that shown in the other figures and has the groove on its upper side. The supplemental members *d* have downwardly-bent feet *b*′, seated in the groove 2, and thence extend horizontally to each side of the bar A.

Where tension-bars are constructed with the supplemental or concrete-locking members integral with the part or parts that act as tension members, the latter cannot well be of the highest tensile strength on account of the concomitant hardness and the difficulty of cutting and forming the supplemental members from it. My present improvement allows the member 1 to be made of the highest tensile strength without encountering said difficulty, and I can get the same structural strength with less metal and weight. Also I am enabled to closely adapt the tension-bar at the place of building to the requirements of the structure, doing away with the necessity of having made to order at the factory in complete form the various tension-bars for the different parts of the building. It will be further noticed that the described means for securing the supplemental members to the member 1 leaves to the latter the full tensile strength of the metal which is contained in it. In other words, there is no metal which is wasted for tensile purposes, as would be the case if the member 1 were perforated or cut away on transverse lines.

The feet of the supplemental members are extended longitudinally in the groove of the main bar sufficiently to enable the bar to have a firm and secure hold on the supplemental member. This may be effected in different ways—for instance, by making the supplemental member wide in the direction of the groove, as shown at 8, Figs. 6 and 10, or by bending such feet in a direction parallel with the groove, as shown at 5, Figs. 3 and 9. It is to be understood that the word "ten-

sion" is herein used in connection with the bar 1 to indicate its general function in receiving the strains imposed by the concrete and its load and not in such a narrow sense as to exclude the use of my improvement from columns or other situations in which it would receive other than simple tension strains. Important advantages result from making the main bar 1 with a continuous groove or grooves. When of such shape, it can be very economically produced by a rolling process. The groove-producing flange of the roll enters and rolls and finishes the interior of the bar to a material degree, thereby giving to the bar an extra amount of rolled tough skin or surface and increased tensile strength. The bar is or may be of uniform cross-section, having no waste metal which is not utilized for strengthening purposes. The supplemental members can be arranged at any desired points along the bar, according to the requirements of the structure or building, and there secured with the greatest firmness. The grooves at their portions which are not occupied by the supplemental members are open to receive the concrete or cement and unite the bar with the same against lateral strains, giving the bar also a strong frictional hold on the concrete to prevent longitudinal displacement. In assembling the supplemental members with the bar the former will readily become seated in the groove without its being necessary to exercise great particularity as to their exact location longitudinally of the bar. The parts can be united by a simple rolling process, the bar having the supplemental members inserted in its groove or grooves being passed between rolls, which act on it from end to end and bring the walls of the groove or grooves to bear securely against the sides of the supplemental members. If the bar is not of too great cross-section, such assembling-rolls may compress the bar as a whole to bring the walls of the grooves nearer together; but my improvements are not to be limited to such precise mode of securing the parts together. If the bar be of such size that it cannot be readily compressed as a whole, I may cause the rolls to act along those parts of the bar between which the groove is situated or I may use a swaging process, as already explained.

What I claim is—

1. The combination, with a body of concrete, of a metal bar supporting such concrete and formed with a continuous longitudinal groove, and one or more supplemental members arranged in said groove at the desired points in the length of the bar and secured in the groove, substantially as and for the purposes described.

2. A metal strengthening-bar for use in concrete and the like, said bar being formed with a continuous longitudinal groove, in combination with one or more supplemental members adjustable along the groove of the bar to the desired points, the bar being adapted to be upset to secure the supplemental members, substantially as and for the purposes described.

3. The combination, with a body of concrete, of a metal bar surrounded by such concrete and formed with a continuous longitudinal groove, and one or more supplemental members secured in such groove, the open portion of the groove being adapted to receive therein, and obtain a hold on, the concrete, substantially as and for the purposes described.

4. A tension-bar for use in concrete and other purposes, consisting of a main, longitudinal, continuously-grooved member, and supplemental members arranged at desired points along the groove of said main member and having their feet or ends extending longitudinally in the groove, the metal of the main member being permanently upset to cause the walls of the groove to rigidly secure said supplemental members, substantially as set forth.

5. A tension-bar consisting of a main, longitudinally and continuously grooved member 1, and a supplemental member *a* formed with a longitudinal portion 6 arranged at a distance from the main member and with legs extending to said main member, the ends of said legs being arranged within the groove of the main member and the metal of the main member being permanently upset to cause the walls of the groove to rigidly secure such ends, substantially as set forth.

6. A tension-bar adapted to be supplied in an unassembled or knockdown condition, consisting of a main longitudinal member formed with a continuous groove 2, and supplemental members having parts fitting said groove and adapted to be arranged along such groove and spaced apart as desired, the main member being of malleable material for the securing of the supplemental members by the permanent upsetting of the material of the main member as described.

7. The combination of the tension-bar, consisting of a longitudinal and continuously-grooved member, beams supporting the ends of said longitudinal member and a tie engaging the upper part of the beam, extending in an inclined direction to said longitudinal member and having its end or foot secured by compression in the groove of the longitudinal member, substantially as set forth.

8. In combination with a body of concrete or the like, a tension-bar consisting of a main longitudinal member having a relatively heavy main body and formed with opposing lips extending outward from and beyond the main body, such lips producing a continuous groove wherein the concrete can enter, and

supplemental members arranged at desired points along the said main member and having their feet or ends between such lips, such main member having its metal permanently upset to cause the lips to rigidly secure such supplemental members, and said body of concrete being arranged to surround and engage the bar and the supplemental members and to enter between said lips of the bar, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN F. GOLDING.

Witnesses:
H. N. Low,
Wm. H. De Lacy.

No. 815,617. PATENTED MAR. 20, 1906

W. MUESER.

MATERIALS OF CONSTRUCTION.

APPLICATION FILED OCT. 13, 1904.

Fig. 1.

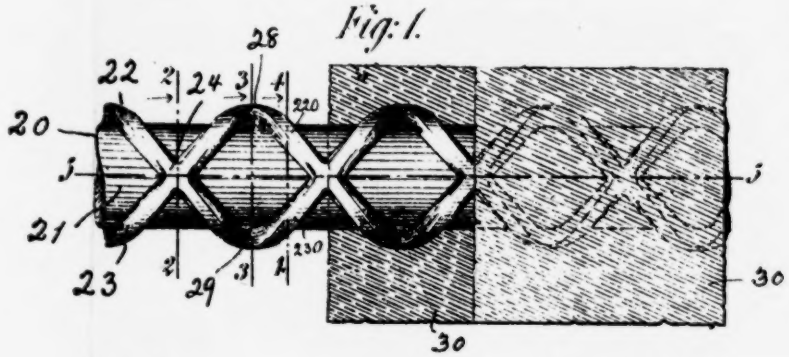


Fig. 2.

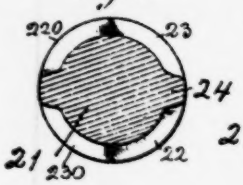


Fig. 4.

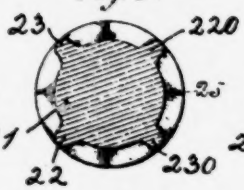


Fig. 3

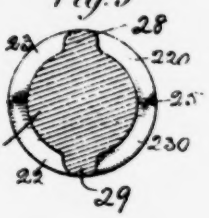


Fig. 5.

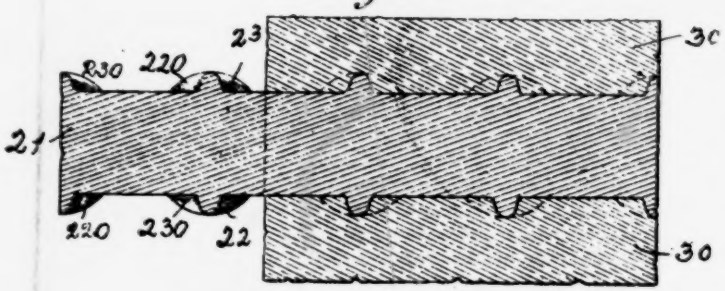


Fig. 6.

Witnesses:
Alan McDonnell
Beverley [illegible]

William Mueser Inventor

By His Attorney William R. Baird

UNITED STATES PATENT OFFICE.

WILLIAM MUESER, OF NEW YORK, N. Y.

MATERIAL OF CONSTRUCTION.

No. 815,617. Specification of Letters Patent. Patented March 20, 1906.

Application filed October 13, 1904. Serial No. 228,342.

To all whom it may concern:

Be it known that I, WILLIAM MUESER, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Materials of Construction, of which the following is a specification.

My invention relates to concrete-steel construction, and its novelty consists in the construction and adaptation of the parts, as will be more fully hereinafter pointed out. In structures of this class the ideal to be attained is to provide a core or bar of steel in a surrounding envelop of concrete, each so fashioned with respect to the other that the strength of the unit throughout shall be uniform and so interlocked that no separation or rupture can occur between the metal and its plastic envelop and no sliding or slipping can take place between their contacting surfaces. Engineers have sought to solve this problem by providing steel bars with depressions and elevations arranged in numerous forms; but so far as known to me such bars if they meet the requirement of substantially uniform ultimate or breaking strength they have no uniform elongation, or stretch under stress, or are of such shape that they are difficult to manufacture, or have sharp corners and edges which cut into the surrounding envelop when strained, or have some bad quality, such as a tendency to slip or twist.

I have invented a form of bar to be used in combination with a concrete envelop as a unit of construction which I believe possesses the ideal advantages above referred to and has none of the disadvantages stated. In brief, it consists of a core of steel comprising a longitudinal body provided externally with continuous ribs wound spirally around the body of the bar in opposite directions and intersecting at regular intervals. The cross-section of the rib outside of the body of the bar is tooth-shaped. The concrete being placed in between the diamond-shaped depressions formed by the intersecting spiral ribs and also surrounding the entire surface of the bar, the latter is held in place without being permitted to be twisted or rotated or pulled out under any strain which will not rupture the body of the bar itself.

In the drawings, Figure 1 is a longitudinal elevation of a bar embodying my invention, showing the concrete envelop in section in two planes, the outline of the bar being shown dotted where it is concealed. Fig. 2 is a transverse section on the plane of the line 2 2 in Fig. 1. Fig. 3 is a similar section on the plane of the line 3 3 in Fig. 1. Fig. 4 is a similar section on the plane of the line 4 4 in Fig. 1. Fig. 5 is a longitudinal central section through the bar and its envelop on the plane of the line 5 5 in Fig. 1, and Fig. 6 is an elevation of the bar without its surrounding envelop.

In the drawings, 20 is a bar of metal which has been rolled or otherwise shaped into the form shown in Figs. 1 and 6. It is composed in this instance of a substantially cylindrical body 21 and is provided externally with one or more spiral ribs or projections, as at 22 220, running around the body in one direction, and one or more ribs or projections, as at 23 230, running around the body in an opposite direction, the ribs intersecting those running in the opposite direction at substantially regular intervals, as at 24, 25, 26, 27, 28, and 29, at what are practically right angles. The ribs 22 220 and 23 230 are preferably made continuous and integral with the body of the bar. The ribs themselves may be made of any approved form in cross-section; but the preferable form somewhat resembles that of the teeth of ordinary cog-wheel gearing, as shown in Fig. 4. If the bar be cut by several planes at right angles to its longitudinal axis, as shown in Figs. 2, 3, and 4, it will be noticed that the cross-sectional areas of the ribs at their intersections 24, 28, and 29, for instance, as shown in Figs. 2 and 3, are about equal to their cross-sectional areas when cut separately by a similar intersecting plane, as shown in Fig. 4. Wherever the two spiral ridges meet, the angle between the ridges is rounded out just enough to make the areas of the intersections 28 and 29, as shown in Fig. 3, equal to areas of the separate ribs 22 and 23 of any cross-section, as shown in Fig. 4. In other words, the cross-sectional area of the bar, including that of the body and ribs, is substantially constant at all points along its length. From this it follows that the bar is of substantially uniform strength throughout. It will be understood, of course, that each bar is embedded in a concrete envelop 30.

This form of bar has several advantages:

First. The spiral ribs can be made as high as may be desired and so as to develop the full strength of the bar without losing its uniform strength or any of the other advantages that

this bar possesses. By developing the full strength of the bar I mean that it shall be so firmly held in its envelop that it is impossible to pull the bar out of the surrounding concrete envelop and that if the effort is made the bar itself must rupture, but not pull out. It is evident, therefore, that I can make the ribs high enough to effect the result absolutely; but whatever the relative height of the ribs to the diameter of the bar the cross-sectional area remains uniform, and therefore also the strength. The importance of this advantage will be seen if it is remembered that bars which have heretofore been used have been provided with corrugations or projections for the purpose of gaining a hold on the surrounding envelop, but which were of such shape that the uniformity of the area of the cross-section was destroyed, resulting in a loss of metal of from five to twenty per cent., or, in other words, the metal projections used for engaging the envelop did not add to the strength of the bar itself, or only partially so. This being not the case in my bar, it has the further advantage that—

Second. On account of the uniformity of the cross-sectional area every particle of metal in the bar contributes to the working strength of the bar, and my bar must, therefore, be the most economical.

Third. For the same reason my bar is of uniform ultimate or breaking strength.

Fourth. Another advantage still more important than the uniform breaking strength of my bar is the uniform elongation under working stresses and before the elastic limit of the metal in the bar is reached—that is, if my bar is, in tension or compression, in its longitudinal axis, as it would be when actually used in building construction—all equal intervals between any two cross-sections of the bar elongate or shorten a like amount. The cause of this uniformity of elongation can be explained as follows: If we consider two closely-adjoining cross-sections of the bar, we have in either the circular area of the bar and in addition four projections representing the cross-section of the four ribs. The only difference between these two sections is to be found in the location of the four projections relative to the center part of the bar, two and two of the projections nearing each other a certain amount: If we consider a third cross-section, equally distant from the second as the second is from the first, we find the same condition repeated—that is, two and two projections have again neared each other an equal amount and as much as was the case between the first and second sections. So on, if consecutive cross-sections equally distant from each other are considered, we find that two and two projections consecutively come closer and closer together at perfectly uniform ratio until each two of the projections meet, which point represents the crossing-points of the spirals, and as soon as each two projections meet, having formed one projection of substantially double width, they separate again and in consecutive cross-sections they go farther and farther apart at the same ratio as they were nearing each other until the cross-section at the next point where the two spiral ribs cross is reached, and so on. It is therefore quite evident that when this bar is rolled the rolls of the mill must exert exactly the same pressure in rolling a part of the bar which lies between any two cross-sections above discussed. In other words, on account of the similar character of all cross-sections of the bar and on account of the uniform ratio of change in location of the projections representing the spiral ribs the metal must flow through the rolls perfectly uniformly and under the same amount of pressure. Since, therefore, the character and amount of pressure which are necessary to form any part of the bar are uniform, it is clear that the bar must have uniform elongation. We know from experience that other forms of bars do not have this advantage, because on account of their form one section of the bar has to be pressed much harder and differently in manufacture than many other sections, and frequently there are sudden changes in form of adjoining sections which prevents a uniform flow of the metal through the rolls. The matter of uniform elongation is very important in practice, as the bars naturally are not used up to the breaking-point, but inside of the elastic limit of the material.

Fifth. Another advantage follows from the reasoning just above made, together with the fact that there are two spiral continuous ribs which at all points form the same angle with the longitudinal center line of the bar, which is that the ribs provide a continuous uniform hold of the same character for the surrounding concrete envelop along the full length of the bar, while other forms of bars provide a hold on the surrounding concrete only at shorter or longer intervals.

Sixth. The double spiral counteracts effectively any tendency to twist or turn under stress.

Seventh. My bar has no sharp edges or corners, which under stress would have a tendency to cut into the concrete envelop, but that, on the contrary, it will be noticed that while the whole surface of the bar is easily and effectively engaged by the concrete envelop there are no sharp corners to induce cutting.

What I claim as new is—

1. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, one of said ribs extending diagonally around the body in one direction and another of said ribs extend-

ing diagonally around the body in an opposite direction and intersecting the first rib.

2. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, one of said ribs extending diagonally around the body in one direction and a plurality of said ribs extending around the body in an opposite direction and intersecting the first rib.

3. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, a plurality of said ribs extending diagonally around the body in one direction and a plurality of said ribs extending diagonally around the body in an opposite direction and intersecting the first-named plurality of ribs.

4. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, one of said ribs extending diagonally around the body in one direction and another of said ribs extending diagonally around the body in an opposite direction and intersecting the first rib, the transverse section at the intersection of the ribs being increased to produce along the whole bar a substantially uniform cross-section.

5. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, one of said ribs extending diagonally around the body in one direction and a plurality of said ribs extending diagonally around the body in an opposite direction and intersecting the first rib, the transverse section at the intersection of the ribs being increased to produce along the whole bar a substantially uniform cross-section.

6. A bar adapted to be used as a core to be embedded in concrete comprising a regularly-formed central body provided with external projecting ribs extending a substantial part of the length of the body, a plurality of said ribs extending diagonally around the body in one direction and a plurality of said ribs extending diagonally around the body in an opposite direction and intersecting the first-named plurality of ribs, the transverse section at the intersection of the ribs being increased to produce along the whole bar a substantially uniform cross-section.

Witness my hand this 11th day of October, 1904, at the city of New York, in the county and State of New York.

WILLIAM MUESER.

Witnesses:
HERMAN MEYER,
ALAN MCDONNELL.

No. 822,587. PATENTED JUNE 5, 1906.

R. A. CUMMINGS.

METAL REINFORCED CONCRETE COLUMN.

APPLICATION FILED JAN. 6, 1905.

FIG. 1

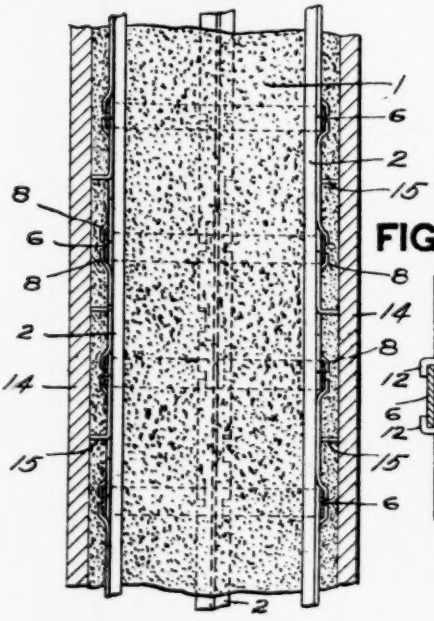


FIG. 2

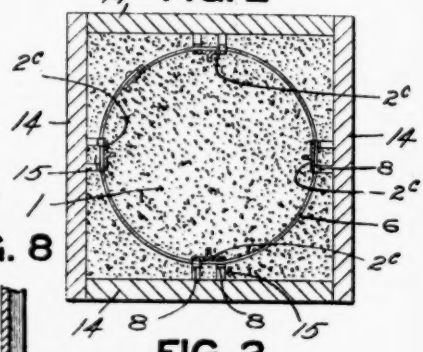


FIG. 8

FIG. 3

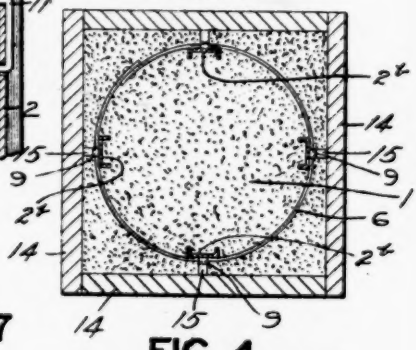


FIG. 5

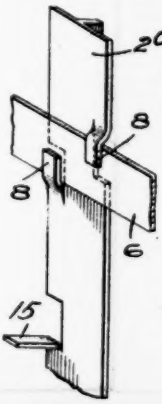


FIG. 6

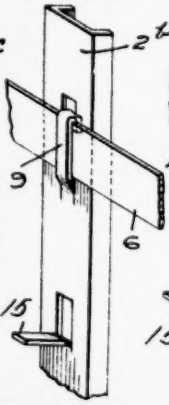


FIG. 7

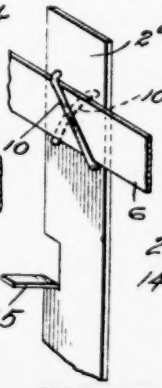


FIG. 4

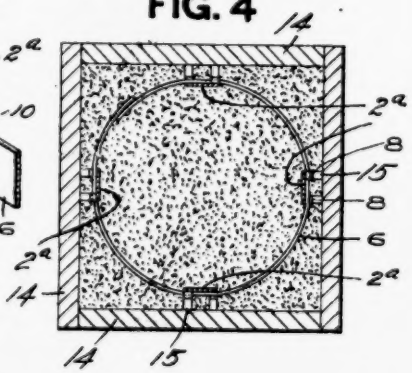
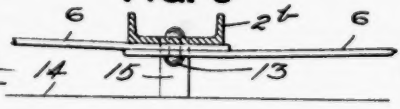


FIG. 9



WITNESSES.

J. R. Keller

Robert C. Totten

INVENTOR.

Robert A. Cummings

By Kerr Totten & Wade

attorneys.

UNITED STATES PATENT OFFICE.

ROBERT A. CUMMINGS, OF BEAVER, PENNSYLVANIA.

METAL-REINFORCED CONCRETE COLUMN.

No. 822,587 Specification of Letters Patent. Patented June 5, 1906.

Application filed January 6, 1905. Serial No. 239,887.

To all whom it may concern:

Be it known that I, ROBERT A. CUMMINGS, a resident of Beaver, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Metal-Reinforced Concrete Columns; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to concrete columns, piles, struts, and the like used in bridges, viaducts, docks, fireproof buildings, and other structures.

The object of my invention is to provide a column or the like which is composed mainly of cement or concrete and which will carry a very heavy load.

Concrete or cement possesses great compressive strength when properly constructed and supported and is also not affected by fire, water, or other elements. For these reasons it is highly desirable in many building constructions. It possesses, however, slight tensile strength, so that when subjected to very heavy loads the concrete will be forced apart laterally, and thus fracture the column.

In my Patent No. 764,883, July 12, 1904, I have described and claimed a column construction wherein the fracturing due to the lateral spreading of the concrete is overcome, this being accomplished by surrounding the main body of the concrete with a series of flat metallic bands which will prevent the concrete from spreading, and consequently from fracturing.

The present invention is an improvement on the column described in my aforesaid patent, one object being to increase the stability of the column by the use of vertical reinforcing members having a cross-section in which the metal is so distributed that the major portion thereof will be as far removed as possible from the center of the column, thus increasing the radius of gyration.

A further object of the invention is to provide means on the vertical members, whether of the character above described or otherwise, for holding them properly spaced from the casing, so that said members will be uniformly distributed in the concrete and be entirely embedded therein.

A further object is to provide improved means for holding the transverse bands against either downward or upward movement.

To these ends the invention consists in details of construction and arrangement hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section through a column constructed according to my invention. Fig. 2 is a transverse section thereof. Figs. 3 and 4 are similar views showing modifications. Figs. 5, 6, and 7 are perspective views showing different manners for holding the bands against movement. Fig. 8 is a vertical section of another modification, and Fig. 9 is a horizontal detail section of still another modification.

In the drawings the concrete is shown at 1, and the vertical reinforcing members at 2. The latter may be variously arranged and located, depending upon the size and shape of the column. They will be of a cross-section, having the metal so distributed that the major portion thereof will be as far out from the center of the column as possible, so as to get the greatest radius of gyration and correspondingly increasing the stability of the column. The most advantageous cross-section to secure this result is a flat rectangular bar, strip, or band, such as shown at 2^a, Fig. 4. Preferably, however, these reinforcing members will be slightly stiffened by providing them with one or more inwardly-projecting flanges, either by using a channel-section, as shown at 2^b, Fig. 3, or a modified angle or T-section, the latter being shown at 2^c, Figs. 1 and 2. The inwardly-projecting flange or flanges of the angle, channel, or T sections greatly stiffen these reinforcing members. The metal nevertheless is so distributed that the major portion thereof is in the web of the channel or in the head of the T-bar, and as these are directed outwardly the radius of gyration is correspondingly large. In my design these vertical members are not intended to act as compression members, although they probably do so to some extent, but they act as tension members to prevent the flexing of the column. They also serve as means for supporting bands 6, which extend transversely of the column and envelop the major portion of the concrete body, these bands serving to hold the concrete against fracturing laterally, and thereby developing the greatest compressive strength of said concrete. The bands 6 therefore will preferably be flat and arranged with their flat

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faces vertical; but they may be of other cross-section. They will be located comparatively closely together, so as to confine the major portion of the body of the concrete. These bands will have their ends united to form continuous bands in any suitable way, either in the manner shown in my patent aforesaid, or as illustrated in my application filed October 22, 1904, Serial No. 229,635, or by riveting the ends of the bands together, as shown in the drawings, or any other suitable way. One feature of the present invention consists in the manner of securing these bands to the vertical members, so as to prevent their movement vertically. Preferably this connection will be so arranged that the bands can neither rise nor fall, thus preventing them from becoming spaced apart irregularly or from assuming a diagonal position.

As shown in Figs. 1, 2, and 5, the vertical members have punched out from their opposite edges the tongues 8, which are arranged diagonally and engage the two edges of the bands and hold the same securely in place and against either falling or rising. The diagonal arrangement of these tongues provides for the easy insertion of both edges of the bands underneath said tongues.

In Fig. 6 there is only one tongue 19, whose upper end is bent across the top of the band to hold it from rising.

In Fig. 7 the bands are shown held in place by means of a staple 10 or the like, embracing the band and having its ends projecting through openings in the vertical member and upset or bent on the back. If desired, two such staples may be used, as indicated in the dotted lines.

In Fig. 8 the staple 11 is located on the rear of the vertical member and has its ends 12 projecting through openings in the vertical members and bent over the front face of the band.

In Fig. 9 a simple rivet 13 is shown for securing the band to the vertical member. This rivet may be one of the rivets which secures the ends of the band together.

Another feature of the invention consists in means for holding the vertical reinforcing members a proper distance away from the casing 14, so that said members will be uniformly distributed and entirely embedded in the concrete. The means for so holding these vertical members consists of projecting portions 15 on the vertical members themselves, which contact with the casing. These projecting portions preferably will be portions punched out of the reinforcing members and bent at an angle thereto to contact with the casing.

The metallic members of the column will be built up in the manner described and then inclosed in the casing and the concrete and cement filled into the same, thus entirely enveloping and embedding the metallic members. The bands 6 envelop the major portion of the body of the concrete, thus holding the same against lateral fracture, and consequently enabling the same to carry very heavy loads. The vertical reinforcing members act as tension members to resist flexing of the column. These vertical members have the major portion of their metal removed the greatest possible distance from the center of the column, thus greatly increasing the radius of gyration and giving the maximum stability to the column for the amount of metal in the vertical members. The bands are connected to the vertical members in such a manner that they will be held absolutely in place even though the workmen should use the bands as a ladder to climb up and down, as they frequently do in constructing the columns. Said bands in the completed column will be in a true horizontal position, thus giving them the maximum efficiency. The entire metallic structure will be uniformly distributed in the concrete by reason of the projecting portions 15, which contact with the casing. The resultant column possesses a very high degree of strength.

What I claim is—

1. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, projections on said vertical members for holding the bands fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands and vertical members.

2. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, said vertical members having projecting portions engaging the bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands.

3. A column or the like, comprising a series of metallic members extending vertically of the column, a series of bands running transversely thereof and enveloping the main body of concrete, said vertical members having openings punched in their bodies, means projecting through said openings engaging said bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands.

4. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, staples having their ends projecting through openings in said ver-

tical members, said staples engaging said bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands and vertical members.

5. A column or the like, comprising a series of metallic members extending vertically of the column, a series of metallic bands running transversely thereof and enveloping the main body of concrete, staples having their ends projecting through openings in said vertical members and bent over the front face of said bands and holding the same fixedly in place transversely to the axis of the column, and concrete or the like enveloping and embedding said bands and vertical members.

6. A column or the like comprising a series of metallic members extending longitudinally of the column, said members being provided with broad thin webs and arranged with said webs toward the outer face of the column, a series of bands connected to said vertical members and extending transversely of the column and enveloping the main body of concrete, and concrete or the like enveloping and embedding said metallic members.

7. A column or the like, comprising a series of matallic members extending longitudinally of the column, said members being provided with broad webs arranged toward the outer face of the column and with an inwardly-projecting flange or flanges, a series of metallic bands extending transversely of the column and connected to said vertical members and enveloping the main body of concrete, and concrete or the like enveloping and embedding said metallic members.

8. A column or the like, comprising a series of metallic members extending longitudinally of the column, said members having the major portion of the metal on the sides facing the outer surface of the column and being provided with projecting portions for contacting with the casing, and concrete or the like enveloping and embedding said metallic members.

9. A column or the like, comprising a series of vertical metallic members provided with projecting portions for contacting with the casing, a series of bands extending transversely of the column and engaging said vertical members, and concrete or the like enveloping and embedding said metallic members.

10. A column or the like, comprising a series of metallic members extending longitudinally of the column and having portions thereof punched out and bent at an angle to contact with the casing, and concrete or the like enveloping and embedding said metallic members.

11. A column or the like, comprising a series of metallic members extending longitudinally of the column and having portions of their bodies punched out and bent at an angle to contact with the casing, a series of bands extending transversely of the columns and engaging said longitudinal members, and concrete or the like enveloping and embedding said metallic members.

In testimony whereof I, the said ROBERT A. CUMMINGS, have hereunto set my hand.

ROBERT A. CUMMINGS.

Witnesses:
F. W. WINTER,
ROBERT C. TOTTEN.

No. 857,821. PATENTED JUNE 25, 1907.

E. McCLURE.

BUILDING CONSTRUCTION.

APPLICATION FILED DEC. 17, 1906.

Fig. 1.

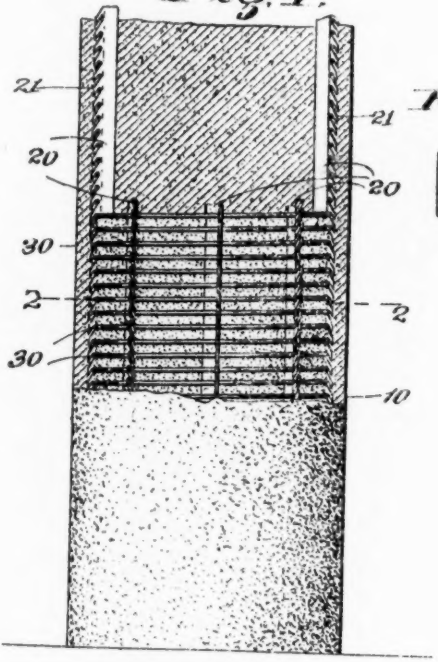


Fig. 4.

Fig. 3.

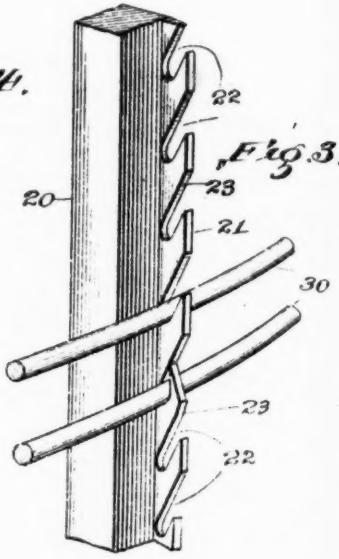


Fig. 5.

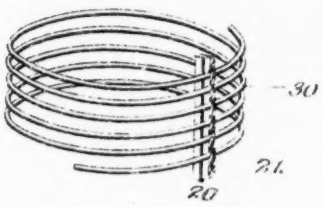


Fig. 2.

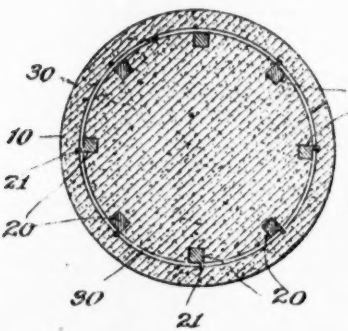


Fig. 8.

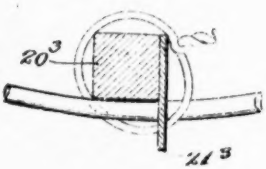
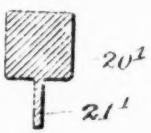


Fig. 6.



Witnesses:
Wm. P. Bond
Laura L. Russell

Fig. 7.

Inventor:
Edward McClure,
by Charles C. Shurtleff
his Atty.

UNITED STATES PATENT OFFICE.

EDWARD McCLURE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO FRANKLIN P. SMITH, OF CHICAGO, ILLINOIS.

BUILDING CONSTRUCTION.

No. 857,821. Specification of Letters Patent. Patented June 25, 1907.

Application filed December 17, 1906. Serial No. 348,119.

To all whom it may concern:

Be it known that I, EDWARD McCLURE, a citizen of the United States, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Building Construction, of which the following is a full, clear, and exact description.

My invention relates to certain new and useful improvements in building construction and more particularly to improvements in the columns which form the upright supporting members, of the building.

The object of the invention is to simplify constructions of this class, to increase the strength thereof, to provide a rigid and practically inflexible binder for the concrete and to otherwise improve the same.

To such end the invention relates to certain novel features of construction and arrangement, a description of which will be found in the following specification and the essential features of which will be more definitely pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawing in which

Figure 1 is a view partly in side elevation and partly in section illustrating the preferred form of my invention. Fig. 2 is a horizontal section taken in the line 2—2 Fig. 1. Fig. 3 is a fragmental perspective view of one of the upright members, and binder wire that form the main frame or skeleton of the column. Fig. 4 is a horizontal cross section through one of the uprights. Fig. 5 is a perspective view of a fragment of the binder wire and one upright, and Figs. 6, 7 and 8 are horizontal cross sections of modified forms of uprights.

In Figs 1 to 5, inclusive, 10 represents a column constructed in accordance with the preferred form of my invention. As shown the frame work of the column contains a number of circumferentially disposed bars or uprights 20, of any suitable cross section, preferably of rolled steel bars. The size of the bars, that is to say the area of their cross section, and their number depend upon the size of the column and the load to be carried, and the ones shown in Figs. 3 and 4 are approximately half size and suitable for a column of say, from 18 to 30 inches. These bars are connected by a coil of wire 30, which is wound around the bars and suitably spaced apart and connected thereto by a serrated or toothed fin or web 21, which extends out from the main part of the bar or rod as clearly shown in Figs. 3 and 4. This fin or web 21, is quite thin as compared with the main body of the bar or rod 20, and the notches or spaces 22, between the teeth 23 preferably extend at an acute angle with respect to the bar or rod. The alternate bars or rods 20, are upended or reversed, to make the teeth and notches extend downward and in a direction opposite to that in which the notches in the other bars extend, the effect being to secure the wire to the bars or rods without any further fastening medium. In practice, however, it is found desirable to clench the ends of some of the teeth down upon the wire and this is done with every fifth or sixth tooth. By thus clenching a few of the teeth the wires and uprights are tied together and no twisting is possible of the frame thus formed. In constructing columns of this class it is important that the main body of the uprights should not be weakened in any manner, inasmuch as its strength will thereby be greatly impaired. Various attempts have been made to space the wires upon the uprights and to tie them thereto, as for instance, they have been wired thereto, but with a construction of this kind the frame when complete, may be twisted around and it is practically impossible to make a perfectly rigid frame, which is obviously necessary in a device of this class. For very light work, thin, notched strips have been used but this is impractical for heavy work, and if rods of large diameter are used with notches and teeth extending the full width of their faces, a great waste of material is occasioned and the bar is weakened by punching out the slots between the teeth. Furthermore the clenching down of teeth of this size becomes a difficult matter requiring extra labor and time. By constructing the rod or bar of the proper cross section to be the most effective for the purpose intended, and providing it with a serrated fin or web for the attachment of the wire, all of the undesirable and impracticable features are avoided and means are provided whereby the rods and wire may be firmly united to make a more rigid frame work, with less amount of metal, and labor in its construction. To complete the column the frame thus formed is filled with concrete 30

and the outer surface covered with two or three inches of concrete, thus completely embedding the frame in the concrete. The concrete surrounds the bars on all of their sides and fills in between the teeth of the fins and between the turns of the coil of wire, so that the frame and concrete are firmly united. A column thus constructed has practically the same carrying capacity as the ordinary steel column occupying the same amount of area in cross section and is less destructible in fire than the unprotected steel columns.

In Fig. 6 the fin or web 21^1 is shown as placed in the center of one of the sides of the bar 20^1, and in Fig. 7 the bar 20^2 is oblong in cross section with the fin or web 21^2 extending out from one of its corners. In Fig. 8 the fin or web is shown as composed of a separate strip of metal 21^3 wired to the main bar 20^3. Other alterations and modifications of the device are possible and I do not therefore desire to limit myself to the specific forms shown and described except as particularly pointed out in the appended claims.

I claim as new and desire to secure by Letters Patent.

1. In a concrete column construction, the combination of one or more upright bars or rods and a spiral encircling band extending throughout the entire length of the column, each bar or rod having a thin toothed longitudinally extending web adapted to form a connecting medium between the encircling band and the bars or rods.

2. In a concrete column construction, the combination of a plurality of circumferentially disposed upright bars or rods, each having a thin toothed longitudinally extending fin or web, a spiral coil of wire wound upon the bars and extending throughout the entire length of the column, each turn of the wire being seated in the notches between the teeth of the fins, and a body of concrete in which the bars and wire are wholly embedded.

3. In a concrete column construction, the combination with a metal frame work, comprising upright bars or rods having thin longitudinally extending fins or webs that contain diagonally extending notches, and a spiral coil of wire wound upon said bars and extending throughout the entire length of the column, each turn of said wire resting in a notch in the fins or webs, of a body of concrete in which the frame work is wholly embedded.

4. In a concrete column construction, the combination of a plurality of upright bars or rods, each having a thin longitudinally extending toothed fin or web, the teeth extending diagonally with respect to the bar, and the teeth on the alternate bars extending upward, and on the others extending downward, a spiral coil of wire wound around the bars or rods and extending throughout the entire length of the column and seated in the spaces between the teeth, and a body of concrete in which the bars and wire are wholly embedded.

5. In a concrete column construction, the combination of a plurality of bars or rods, each having a longitudinally extending toothed web, a spiral coil of wire wound around the bars or rods and extending throughout the entire length of the column and seated in the spaces between the teeth, certain of which are clenched down upon the wire, and a body of concrete in which the bars and wire are wholly embedded.

In witness whereof I have executed the above application for Letters Patent of the United States, at Chicago, county of Cook and State of Illinois, this twelfth day of December, 1906.

EDWARD McCLURE.

Witnesses:
R. R. BARNITT,
A. FRISBIE.

No. 859,312. PATENTED JULY 9. 1907.

D. MAXWELL.

REINFORCE FOR CONCRETE.

APPLICATION FILED APR. 6, 1906.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

WITNESSES

Warren W. Swartz

P. A. Baldwin Jr.

INVENTOR

David Maxwell

by Cushman & Symes

his attys

UNITED STATES PATENT OFFICE.

DAVID MAXWELL, OF DETROIT, MICHIGAN.

REINFORCE FOR CONCRETE.

No. 859,312. Specification of Letters Patent. Patented July 9, 1907.

Application filed April 6, 1906. Serial No. 310,260.

To all whom it may concern:

Be it known that I, DAVID MAXWELL, of Detroit, Wayne county, Michigan, have invented a new and useful Reinforce for Concrete, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved reinforce; Fig. 2 is a plan view of the blank from which it is formed; Figs. 3 and 4 are cross sections on the line III—III and IV—IV respectively of Figs. 1 and 2; and Figs. 5, 6 and 7 are detail views of modified forms.

My invention relates to the reinforcing of concrete beams and structures.

The object of the invention is to provide a reinforce in which the bottom chord is increased in cross-sectional area from each end toward the center, and provide for cutting a truss or reinforce from a single plate or shape having the chord of increasing strength and braces extending upwardly.

In the form shown, I take a blank 2, which is preferably provided along one edge with a thickened portion 3. This blank is cut into stepped shape shown in Fig. 2, and from each step the metal is slitted inwardly on the line *a—a*. The central portion of the blank is then crimped in opposite directions, which may be done by passing it through fluted or corrugated rolls or in a press. The layers are then compressed together, as shown in cross-section in Fig. 3, and the cut brace members are bent outwardly and upwardly from each side portion. These braces 4 pass above the neutral axis of the girder into the compression portion of the concrete beam or slab to which the stresses are transferred as in a bridge. In the form shown, I have indicated in dotted lines a channel 5 having its web cut to form cross bars 6, over which the upper ends of the braces are bent or hooked, as shown. In this case the channel or shape will form a part of the compression member of the beam and bind the mass together.

In Fig. 5 I show the end portion of a form similar to that of Fig. 1, except that the end of the lowest portion of the chord is left horizontal. The extreme end may be turned up slightly, as shown.

In Fig. 6 I show an end view of another form of blank wherein the reinforcing side or edge portion is of a different form.

In Fig. 7 I show a form where the web portion gradually tapers in thickness from one side toward the other. This is especially desirable where it is desired to thicken the diagonals near the ends where they receive the greatest shearing stress, they being thinner toward the center where this stress approaches zero. The diagonals may also be made closer together as they approach the ends of the reinforce to more fully resist the shearing stress. The original plate or shape may be rectangular in form instead of having the step form shown in Fig. 2. This will leave a surplus of material which may be bent towards the center parallel with the bottom chord at the intended height of the diagonal; or bent to form reinforcements for the diagonals themselves.

The reinforce or truss is embedded in the concrete beam in the ordinary manner, and the bottom chord increases in section toward the center of the beam in accordance with the principles of bridge trussing. The construction of my truss allows the diagonals being spaced along the bottom chord at distances proportional to the increase in shearing stress; that is, the diagonals are preferably placed closer together at the ends than toward the center.

The advantages of my invention result from the simplicity and cheapness of the reinforce, and from the strength of the concrete beam in which it is embedded. The blank may consist of a plate or a rolled shape. The cuts which form the braces can be made either before or after crimping. The metallic top chord member may or may not be used as desired, and other variations may be made in the form and arrangement of the parts without departing from my invention.

I claim:—

1. A metal reinforce for concrete structures, consisting of a single plate or shape cut into stepped form and increasing in cross-section from each end toward the center, the end portions of at least some of the steps being bent upwardly to form braces; substantially as described.

2. A metal reinforce for concrete structures, having a bottom chord formed from a single piece cut away at its end portions to increase its cross-section from each end toward the center, and having integral portions which are bent upwardly therefrom to form oblique braces; substantially as described.

3. A concrete reinforce having a longitudinally folded lower chord increasing in section toward the center, and braces projecting upwardly therefrom said chord and braces being formed from a single integral shape; substantially as described.

4. A concrete reinforce having a longitudinally folded bottom chord increasing in cross-section from the ends toward the center and having stepped portions cut and bent upwardly and outwardly into braces; substantially as described.

5. A metal reinforce for concrete structures, having a lower chord formed from a single shape of increasing cross-section from the ends towards the center, and slitted longitudinally to form portions which are bent upwardly to constitute braces; substantially as described.

6. A metal reinforce for concrete structures, having a lower chord formed from a single shape of increasing cross-section from the ends towards the center, and slitted longitudinally to form portions which are bent upwardly to constitute braces, said braces extending above the neutral axis of the structure; substantially as described.

7. A metal reinforce for concrete structures, consisting of an integral plate or shape of stepped form, with a

cut or slit extending from each step longitudinally toward the center of the plate or shape, and the cut or slitted portions bent upwardly to form oppositely inclined diagonals or braces; substantially as described.

8. A metal reinforce for concrete structures, having an integral plate or shape whose web is formed with a series of straight parallel longitudinal slits in different planes, said slits all extending from the ends inwardly toward the central portion of the shape, the slitted portions being bent upwardly to form brace members; substantially as described.

9. A metal reinforce for concrete structures, having an integral plate or shape whose web is thinner at one side than at the other and is of increasing cross-section from the ends toward the center, and formed with a series of parallel longitudinal slits in different vertical planes, the slited portions being bent upwardly to form bracing members; substantially as described.

10. A metal reinforce for concrete structures, comprising an integral plate or shape formed with a series of parallel longitudinal slits in different vertical planes, the slitted portions being bent upwardly to form diagonals or bracing members, and the web of the plate or shape having thickened portions which cause the diagonals or bracing members near the ends of the reinforce to be heavier than those near its center; substantially as described.

11. A metal reinforce for concrete structures, consisting of an integral plate or shape having stepped end portions formed with longitudinal parallel slits, the slitted step portions being bent upwardly to form a series of oblique braces; substantially as described.

12. A metal reinforce for concrete structures, having a bottom chord consisting of a shape folded longitudinally upon itself, and having a plurality of slits extending from each end portion towards the center, some at least of the slitted portion being bent upwardly to form braces; substantially as described.

In testimony whereof, I have hereunto set my hand.

DAVID MAXWELL.

Witnesses:
CHARLES F. DELBRIDGE,
ARTHUR D. STANSELL.

No. 868,065. PATENTED OCT. 15, 1907.

J. S. BARNES.

CONCRETE REINFORCEMENT.

APPLICATION FILED JUNE 26, 1906.

2 SHEETS—SHEET 1

Fig. 1.

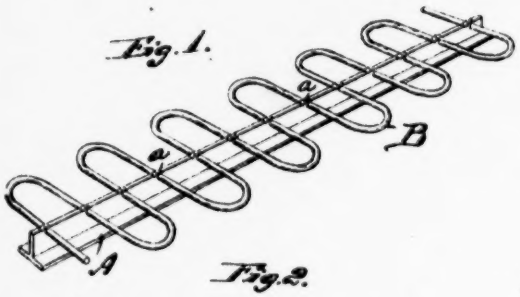


Fig. 6.

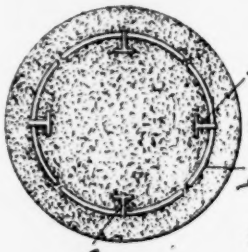


Fig. 2.

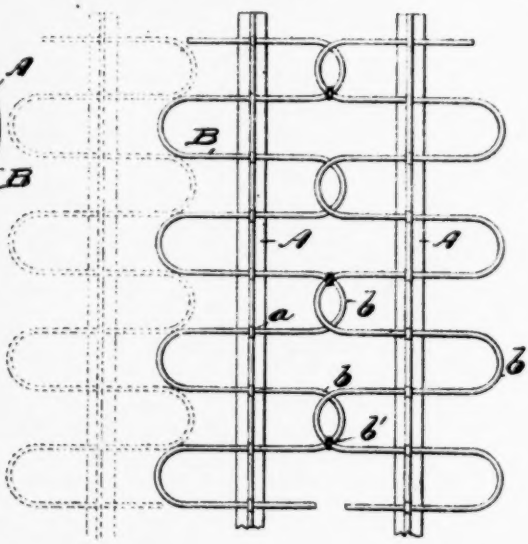


Fig. 5.

Fig. 7.

Fig. 3.

Fig. 4.

WITNESSES:

Olivier E. Barthel

Henry F. Villaret

INVENTOR

John S. Barnes

BY

L. E. Thomas

Attorney

No. 868,065. PATENTED OCT. 15, 1907.

J. S. BARNES.

CONCRETE REINFORCEMENT.

APPLICATION FILED JUNE 28, 1906.

2 SHEETS—SHEET 2.

Fig. 8.

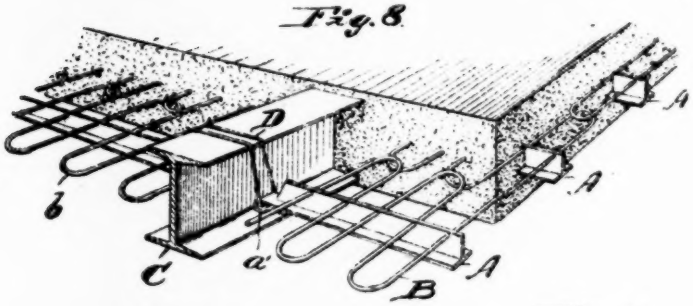


Fig. 9.

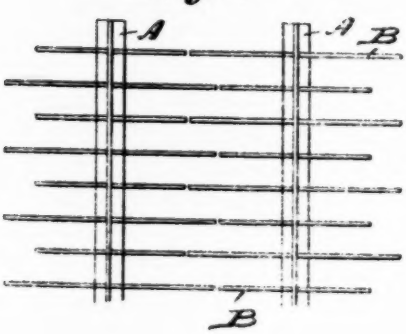


Fig. 10.

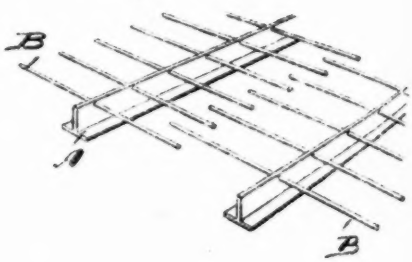


Fig. 13.

Fig. 11.

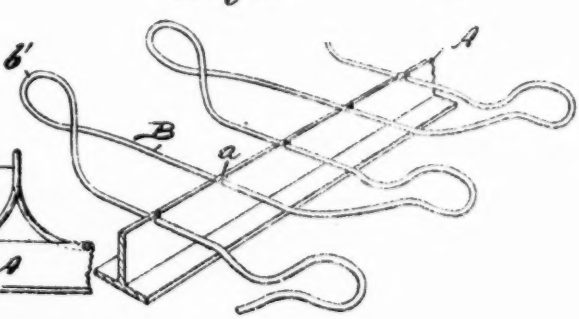
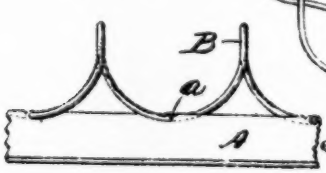


Fig. 12.



WITNESSES:

Oliver C. Barthel

Henry E. Tullock

INVENTOR

John S. Barnes

BY

L. E. Thomas

Attorney

UNITED STATES PATENT OFFICE.

JOHN S. BARNES, OF DETROIT, MICHIGAN.

CONCRETE REINFORCEMENT.

No. 868,065. Specification of Letters Patent. Patented Oct. 15, 1907

Application filed June 28, 1906. Serial No. 323,827.

To all whom it may concern:

Be it known that I, JOHN S. BARNES, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Concrete Reinforcements, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in means for reinforcing concrete used in the construction of beams, floors, columns, etc., for buildings, or other structures, shown in the accompanying drawings and more particularly set forth in the following specification and claims.

In the drawings: Figure 1 is a perspective view of the reinforcing member. Fig. 2 is a plan view showing two or more of the members in adjacent relation. Fig. 3 is a sectional view through a floor or ceiling showing the reinforcement embedded in the concrete and in turn supported by the usual I-beams. Fig. 4 is a detail showing the manner of securing the binding rod or wire in the web of the T-bar. Fig. 5 is a variation showing the T-bar crimped to increase its bearing surface in the concrete. Fig. 6 is a cross-sectional view through a column showing the binding wires formed on the arc of a circle, to adapt them for purposes of this and like constructions. Fig. 7 is a perspective view of the reinforcement employed in Fig. 6. Fig. 8 is a perspective view showing a portion of the concrete floor and ceiling broken away to expose the reinforcing members and the manner of engaging the latter with the I-beams. Fig. 9 is a modification of the form of the binding wires employed in the reinforcing member. Fig. 10 is another modification of the same. Fig. 11 shows the ends of the binding wire bent upward in the form of a loop to increase its cross-sectional reinforcing area. Fig. 12 is an elevation of the reinforcing member shown in Fig. 11 looking toward the ends of the binding wire. Fig. 13 shows a modification in the form of the T-bar for supporting the binding wire.

The object of my invention is to construct a reinforcement which shall be inexpensive to manufacture and readily adapted for use in different forms of concrete construction. Other advantages will hereafter appear.

Referring to the letters of reference shown in the drawings, A is an ordinary T-bar, though other forms of commercial iron may be employed if desired. At suitable intervals throughout its length, depressions *a*,—or perforations, if desired,—are made in the web of the bar to receive the binding wire B, arranged to project in opposite directions from the web of the bar. When the T-bars are assembled in adjacent relation, the return bends *b* of the binding wire may overlap, as shown in Fig. 2, and if desired, locked together by tie wires *b'*,—or, as indicated in dotted lines in the same figure, the return bends may project into the open end of the loop of the opposite binding wire and, if desired, be locked together where the wires abut.

As shown in Figs. 3 and 8 of the drawings, the T-bars are linked together over the I-beams C, as indicated at D, the T-bars being perforated at their ends, or provided with a return bend *a'*, as indicated in the views referred to. When used in reinforcing concrete columns or other like structures, the binding wires B are formed on an arc of a circle, as shown in Figs. 6 and 7 of the drawings, to more particularly adapt them to the necessities of this construction.

By crimping the T-bar supporting the binding wires, I greatly increase the binding surface exposed to the concrete and thereby add to its efficiency.

While I have shown the web of the T-bars cut with a U-shaped opening to receive the binding wires, the construction is such that the edges of the web are closed over the binding wire to secure it in the T. In place of the depressions in the T-bar the web may be perforated to receive the wire, being afterwards swaged to secure it in the web of the bar. I prefer, however, the construction shown as it is more simple, and cheaper to manufacture.

In the modification shown in Fig. 9, the binding wire is made of short sections, each alternate wire being longer than that on either side in order that the adjacent T-bar with its series of binding wires may interlock in order to afford an unbroken reinforcement when embedded in the concrete.

In the form shown in Fig. 10, the binding wires are of equal length, but when the reinforcing members are placed in adjacent relation they are placed so that the binding wires will interlock in order to present an unbroken surface. It will be seen that in the use of either of the forms shown in Fig. 9 or 10 that considerable wire will be saved, as the wire necessary to form the loop in the other figures will be dispensed with.

In the modification shown in Figs. 11 and 12, the loops at the end of the binding wire are turned at right angles in order to widen the reinforcing area.

It will be seen that by the employment of my invention the entire concrete area is knit together, it being impossible for a crack to extend in a direction not covered by reinforcing wire.

Having thus described my invention, what I claim is:—

1. A reinforcement for concrete construction consisting of a supporting bar including a base and also a web portion, the web portion having a series of pairs of fingers along its upper edge, said fingers being bendable in the longitudinal plane of the web, and a continuous binding

wire secured at intervals to the web between said pairs of fingers, the wire projecting upon opposite sides of the web beyond the outer opposite edges of the base portion of the bar.

2. A reinforcement for concrete construction consisting of supporting bars each including a base and also a web portion having a series of pairs of fingers along its upper edge, the bars being arranged in parallelism and the fingers of each web being bendable in the longitudinal plane of the web, a continuous binding wire secured to the web of each bar between the corresponding fingers, each wire projecting upon opposite sides of the web beyond the outer opposite longitudinal edges of the base of the corresponding bar, the wire of one bar overlapping the wire of the other bar, and means for connecting the overlapping portions of the wires together.

3. A reinforcement for concrete construction consisting of a beam including a base, supporting bars arranged in alinement upon opposite sides of the beam with the inner ends of the bars resting upon the base, the ends of the bars adjacent the beam having eyes therein, means passed through the eyes of the bars and bridging the beam to secure the beam and bars together, and binding wires secured to each bar, the binding wires of adjacent bars upon each side of the beam overlapping it at intervals, and means for connecting the overlapping parts of the binding wires together.

4. A reinforcement for concrete construction consisting of a beam including a base, supporting bars arranged in alinement upon opposite sides of the beam with the inner ends of the bars resting upon the base, the ends of the bars adjacent the beam having eyes therein, means passed through the eyes of the bars and bridging the beam to secure the beam and bars together, each bar including a base and also a web portion having a series of fingers in its upper edge bendable longitudinally of the web, and a continuous binding wire secured to the web of each bar between the corresponding fingers, each wire projecting upon opposite sides of the web beyond the outer opposite longitudinal edges of the corresponding bar, the wire of one bar overlapping at intervals the wire of the adjacent bar upon corresponding sides of said beam, and means for connecting the overlapping parts of the wires together.

In testimony whereof, I sign this specification in the presence of two witnesses.

JOHN S. BARNES.

Witnesses:
S. E. THOMAS,
HENRY E. VILLERAT

A.D. 1874, 14th *Mar.* N° 1715.

Constructing Buildings, &c.

LETTERS PATENT to Thaddeus Hyatt, of Gloucester Gardens, Hyde Park, in the County of Middlesex, Manufacturer of Patent Lights, for the Invention of "**Improvements in Constructing, Lighting, Ventilating, and Fireproofing Buildings, Partly applicable to Building Materials and Appliances, and to Ships.**"

Sealed the 24th July 1874, and dated the 14th May 1874.

PROVISIONAL SPECIFICATION left by the said Thaddeus Hyatt at the Office of the Commissioners of Patents, with his Petition, on the 14th May 1874.

I, **Thaddeus Hyatt**, of Gloucester Gardens, Hyde Park, in the County of Middlesex, Manufacturer of Patent Lights, do hereby declare the nature of the said Invention for "**Improvements in Constructing, Lighting, Ventilating, and Fireproofing Buildings, Partly applicable to Building Materials and Appliances, and to Ships.**" to be as follows:—

The erection of combustible buildings being partly if not mainly attributable to the ease and cheapness of obtaining materials for such constructions and the difficulty of obtaining cheap and reliable fire-

suitable shaping dies or otherwise manipulated until made to represent the forms of ordinary solid beams, such as the web and flange, the U shape, or other forms, as shewn by Figure 3.

a, *a*, Figures 1, 2, and 3, represent the interlaced metal and *b*, *b*, the concrete or other equivalent material. Figure 2 represents a beam made of two shells or skeletons of interlaced material, an outer one *a*, *a*, and an inner one a^1, a^1, both imbedded in the concrete *b*, *b*. This beam as represented in Figure 2, is hollow but may be solid if preferred. The tie *c* may be rivetted or otherwise attached to the metal skeleton, as shewn, and is preferably placed well up in the concrete to be out of the way of flame in case of being attacked by fire.

Figures 4 and 5 represent the metal skeleton *a*, *a*, in the form of a spiral made of flat metal ribbon, the tie-rod C being attached to the bottom thereof on the inside as shewn, *b*, *b*, being the concrete plastic or cement. This spiral coil may, if desired, have wire netting added to it, or longitudinal strips of metal somewhat similar in shape to the tie placed along its sides and top, and fastened thereto as an additional hold to the concrete.

According to another part of my Invention I make the metal skeleton of sheet metal by first cutting it with slits *d*, *d*, Figure 6, Sheet 2; *e*, *e*, being the uncut parts of the sheet. I then pull out *e*, *e*, in opposite directions from each side of the sheet and thereby obtain tubular forms, as shewn by Figures 7, 8, 9, and 10; *e*, *e*, being the metal; *f*, *f*, Figure 8, being the concrete; and *c*, *c*, being the tie-rod.

According to another part of my Invention I make tubular beams of solid sheet metal and tie rods, employing in some cases metal sufficiently heavy to form a material portion of the strength of the beam, and in others to merely serve the purpose of the skeleton beams above described, viz., to unite the tie to the earthy or stony portion of the beam. Figures 11 and 12 represent this form, each being made, as here shewn, of two cylindrical metal shells or tubes, an outer one *a*, *a*, and an inner one a^1, a^1; *c*, *c*, being the tie rod, and *f*, *f*, the concrete. The cylinders are concentric in Figure 11, but excentric to one another in Figure 12.

According to another part of my Invention I make floors, roofs, and other constructions of metal beams arranged to be readily connected together laterally with tubes placed between them which

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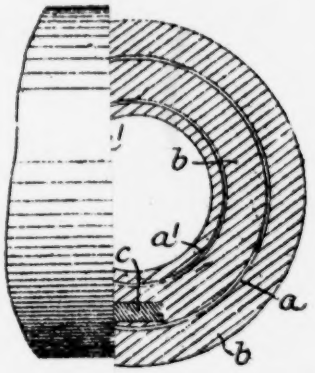
(4 SHEETS)
SHEET 1

FIG. 2.



A.D. 1874. MAY 14. No. 1715.
HYATT'S SPECIFICATION.
[2nd Edition.]

[4 SHEETS; SHEET 1.

FIG. 1.

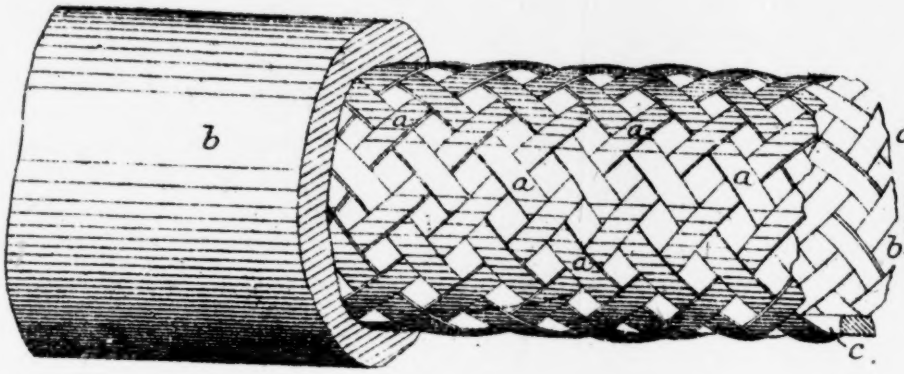


FIG. 2.

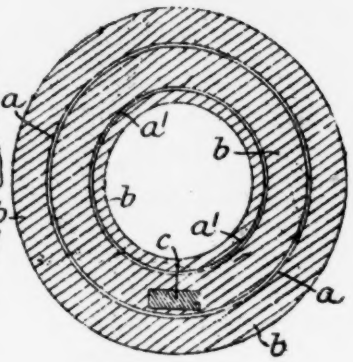


FIG. 3.

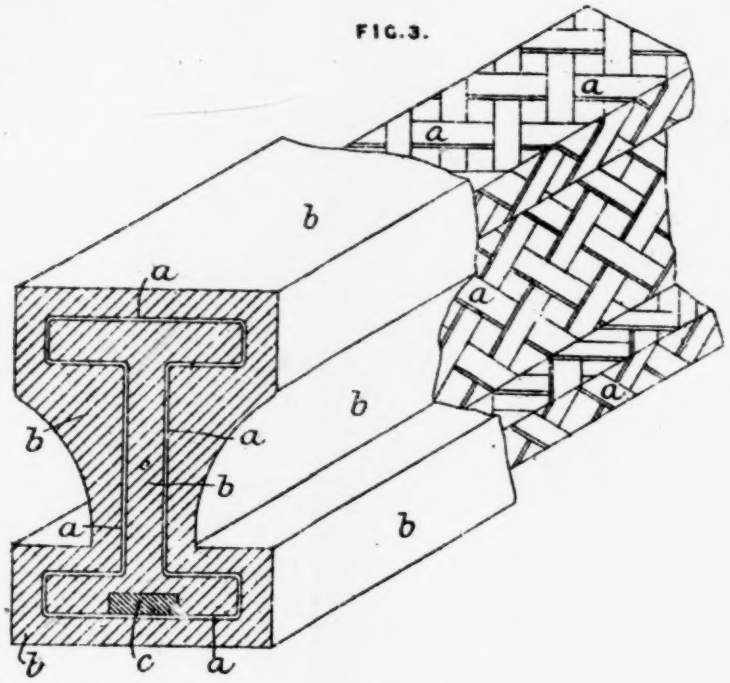


FIG. 4.

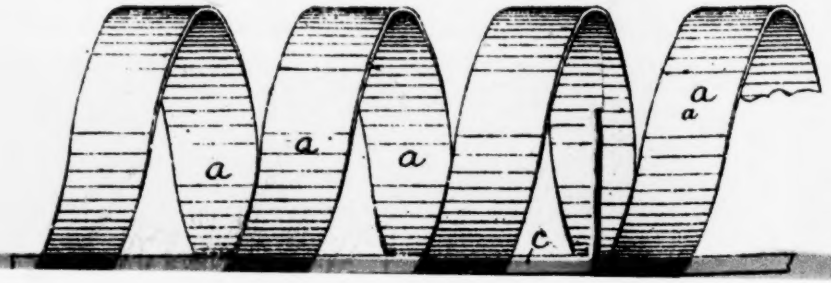
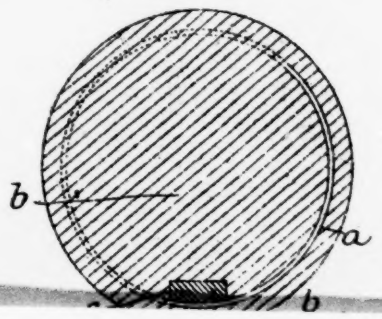


FIG. 5.



KAISERLICHES PATENTAMT.

AUSGEGEBEN DEN 11. JANUAR 1894

PATENTSCHRIFT

— № 73004 —

KLASSE 80: THON- UND STEINWAAREN-INDUSTRIE.

ROBERT KIESERLING IN HAMBURG UND MAX MÖLLER IN ALTONA.

Verfahren zur Herstellung von Cementhohlkörpern aus Stampfbeton mit stufenweise eingeformtem Eisengerippe.

Patentirt im Deutschen Reiche vom 24. März 1892 ab.

In manchen Fällen ist es zweckmäfsig, zur Erhöhung der Festigkeit von Cementhohlkörpern in die letzteren Eiseneinlagen einzuformen, welche von der Cementmischung vollständig umhüllt werden. Sobald aber diese Eiseneinlagen, die aus Drahtgeflecht, Drahtgewebe oder einer Reihe fest mit einander verbundener Stücke bestehen können, gleich als ein Ganzes aufgestellt werden, was bisher ausnahmslos geschah, werden die Vorzüge, welche das stufenweise Einformen des Cementhohlkörpers besitzt, sehr beschränkt, weil das Einstampfen der Cementmischung in die Form häufig fast unausführbar ist.

Um nun das Einstampfen der Cementmischung in die Form, den einzigen Weg, Hohlkörper von gröfster Festigkeit und Gleichmäfsigkeit im inneren Gefüge zu erzielen, beibehalten und doch gleichzeitig den derart erzeugten Hohlkörper mit einem Eisengerippe versehen zu können, ohne das Einstampfen zu behindern, soll das nachstehend beschriebene Verfahren dienen.

Dasselbe besteht im wesentlichen darin, dafs das Eisengerippe aus einzelnen Theilen zusammengesetzt wird, die nach und nach, entsprechend dem Fortgange der eigentlichen Formarbeit, in Verbindung mit einander gebracht werden.

Da nun im Allgemeinen aus praktischen Gründen die das Einstampfen bewirkenden Mittel in senkrechter Richtung bewegt werden, so ist nachstehend, obwohl es ja auch denkbar ist, dafs von der Seite eingestampft wird, angenommen worden, dafs das einstampfende Werkzeug in senkrechter Richtung auf- und abwärts bewegt wird. In dem Falle ist es angängig, die senkrecht oder annähernd senkrecht stehenden Theile des Eisengerippes sofort als Ganzes aufzustellen, oder aber auch dieselben aus einzelnen über einander liegenden Stücken nach und nach, dem Fortgange der Formarbeit entsprechend, zusammenzusetzen.

Dieses letztere Verfahren, welches für die Herstellung von Hohlkörpern der verschiedensten Form und Gröfse anwendbar ist, soll nunmehr an einem Beispiele erläutert werden. Im engen Anschlufs an das in der Patentschrift Nr. 73003 beschriebene Verfahren der Herstellung eines Cementrohres aus Stampfbeton soll nachstehend angenommen werden, dafs es sich wieder um die Herstellung eines Cementrohres, jedoch mit Eisengerippe, handelt.

Zur Herstellung desselben verfährt man folgendermafsen:

Nachdem in den über der Grundplatte und zwischen dem Kern und der untersten Ringschicht des Mantels bestehenden Hohlraum eine in ihrer Stärke nach der Gröfse des herzustellenden Rohres sich richtende Lage *a* der Cementmischung rings um den Kern einge-

stampft ist, wird auf diese Lage ein Ring *b* gelegt, der entweder aus einem Stück oder auch aus mehreren mit einander verbundenen oder auch unabhängig von einander bestehenden Theilen gebildet ist. Dieser Ring *b* bezw. diese einzelnen von einander unabhängigen Stücke werden mit senkrechten Stützen *c* versehen, die mit dem einen Ende unter den Ring geschoben und umgeschlagen werden, wie das in den Fig. 2 und 3 ersichtlich ist.

Die Verbindung der Stützen *c* mit dem Ring *b*, sowie die Form dieser Stücke ist natürlich mannigfacher Abänderungen fähig, ohne dafs darum der Zweck derselben verfehlt würde. Nachdem nun diese Stützen, welche wegen ihrer im Verhältnifs zur Dicke des Rohres äufserst mäfsigen Stärke das Einstampfen des Betons in keiner Weise hindern, sämmtlich aufgebracht sind, wird der noch freie Hohlraum zwischen dem Kern und der ersten Mantelschicht bis an den Rand der letzteren fest mit der Cementmischung ausgestampft und darauf auf die Betonoberfläche bezw. die Stützen *c* ein Ring b^1 aufgelegt, der entweder schon mit Stützen c^1 versehen ist oder jetzt erst solche durch Unterführen und Umschlagen der Enden derselben um den Ring erhält. Ehe nun die zweite Mantelschicht aufgebaut und der zwischen derselben und dem Kern bestehende Hohlraum mit der Cementmischung ausgefüllt wird, werden die aus dem eingestampften Beton herausstehenden Enden der Stützen *c* mit dem von denselben getragenen Ring b^1 in passender Weise, am einfachsten durch Umschlagen um denselben, verbunden. Darauf wird die zweite Mantelschicht aufgebaut und der von dieser Schicht einerseits, dem Kern und der Betonoberfläche der ersten Lage andererseits begrenzte Hohlraum durch Einstampfen der Cementmischung bis an den oberen Rand der Mantelschicht ausgefüllt. Nachdem dann ein neuer Ring b^2 aufgelegt und mit Stützen c^2 versehen ist, werden die Enden der Stützen c^1, wie das vorher bei den Stützen *c* und dem Ring *b* geschah, um den Ring b^2 gebogen und die dritte Mantelschicht aufgebaut.

In dieser Weise schreitet die Bildung des Rohres sowie das Einformen des Eisengerippes vor, ohne dafs durch das letztere das Einstampfen des Betons in irgend welcher Hinsicht erschwert wäre. Ist das Rohr ein muffenloses, dann wird der letzte Ring, der keine senkrechten Stützen mehr erhält, nicht in der Höhe der oberen Kante der letzten Mantelschicht gelegt, sondern einige Centimeter tiefer und in der alten Weise mit den unter demselben liegenden Stützen verbunden. Der über dem letzten Ring liegende freie Raum der Form wird darauf ausgestampft und so erreicht, dafs das Eisengerippe von der Cementmischung allseitig umgeben ist.

Handelt es sich dagegen um die Herstellung eines Rohres mit Muffe, dann wird in gleicher Weise verfahren, jedoch aufserdem noch in Höhe des oberen Randes jener Mantelschicht, welche etwa in der Mitte der Muffe abschliefst, eine Seitenstrebe *d* abgezweigt, welche eine oder auch bisweilen zwei Stützen *e* trägt, die mit Ringen *f* in Verbindung stehen. Der letzte dieser Ringe besitzt natürlich auch keine Stützen. Derselbe wird vielmehr nur von solchen getragen und steht wieder einige Centimeter unterhalb des oberen Randes der Muffe, so dafs also auch dieses Nebengerippe allseitig von dem Beton umgeben ist.

Von dem eben geschilderten Verfahren zwar etwas abweichend, mit demselben aber in dem oben dargelegten Princip übereinstimmend, sind die in der Zeichnung noch veranschaulichten Verfahren.

In den Fig. 5, 6 und 7 ist in Seitenansicht und Grundrifs ein Eisengerippe dargestellt, dessen senkrechte Stützen *g* aus einem oder auch mehreren mit einander verbundenen Stücken bestehen können. Diese Stützen sind je mit einer Reihe von Aussparungen versehen, in welche ein Draht *h* zu liegen kommt, welcher spiralförmig auf die Stützen, dem Fortgange der Formarbeit entsprechend, gewickelt wird. Die in 7b und 7c gegebenen Ausführungsformen empfehlen sich insofern, als bei Beanspruchung des Rohres auf Zug der Draht nach beiden Richtungen hin ein Widerlager findet, was bei der durch die Fig. 5 und 7a veranschaulichten Ausführungsform nicht der Fall ist. Das in den Fig. 8 bis 11 dargestellte Eisengerippe bedarf hinsichtlich seiner Herstellung keiner weiteren Erläuterung.

Das in der Patentschrift Nr. 73003 beschriebene Verfahren und das vorliegende gleichen sich insofern aufserordentlich, als dort Theile der Form so lange fortgelassen wurden, bis dieselben unbedingt benöthigt wurden; dasselbe geschieht hier mit den einzelnen Theilen des Eisengerippes. Die Vorzüge des Verfahrens liegen, abgesehen davon, dafs das nicht genug zu schätzende Stampfverfahren beibehalten werden kann, darin, dafs durch das Eisengerippe nicht allein die Festigkeit des Hohlgegenstandes wesentlich erhöht wird, sondern auch der Cement vor und während des Abbindens einen vorzüglichen Halt gewinnt, so dafs das Abbrechen des Mantels sowohl als des Kernes sowie das Fortschaffen des Rohres von der Grundplatte früher geschehen kann, als das bei Herstellung der Rohre nach dem in der erwähnten Patentschrift beschriebenen Verfahren der Fall ist.

PATENT-ANSPRUCH:

Bei dem im Patent Nr. 73003 beschriebenen Verfahren zur Herstellung von Cementhohlkörpern aus Stampfbeton ein stufenweise eingeformtes Eisengerippe, dessen Aufbau in der Weise erfolgt, dafs jene Theile desselben, welche parallel oder annähernd parallel zur Bewegungsrichtung des einstampfenden Werkzeuges liegen ganz aufgebaut oder allmälig vervollständigt werden, während die diese Theile durchkreuzenden Stücke des Eisengerippes entsprechend dem Fortgange der Formarbeit eingefügt werden, zum Zweck ungehinderten Einstampfens des Betons in die Form.

ROBERT KIESERLING IN HAMBURG UND MAX MÖLLER IN ALTONA.

1892

Verfahren zur Herstellung von Cementhohlkörpern aus Stampfbeton mit stufenweise eingeformtem Eisengerippe.

Fig. 1.

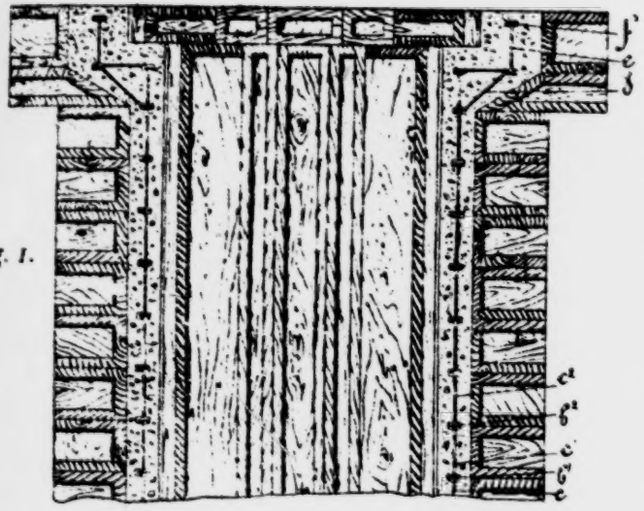
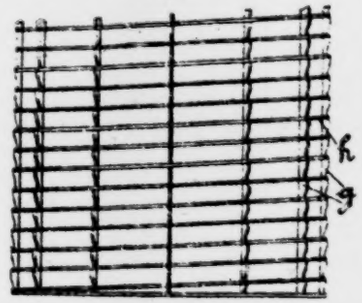


Fig. 5.



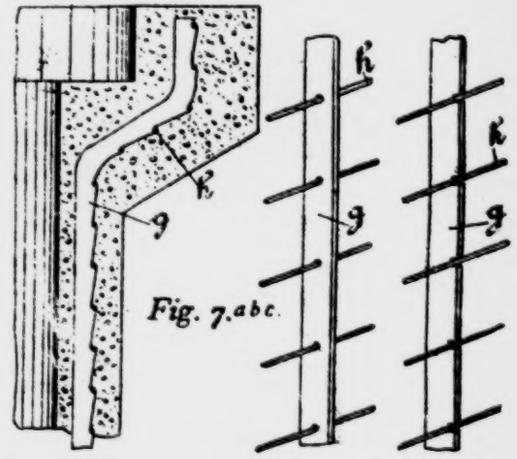


Fig. 7.abc.

Fig. 6.

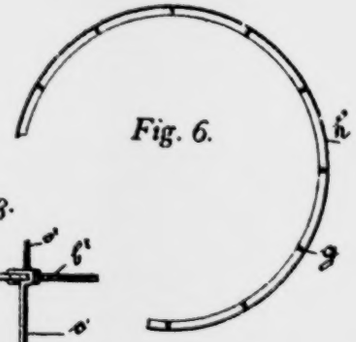


Fig. 8.

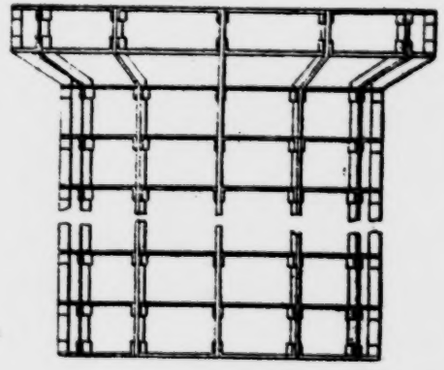


Fig. 3.

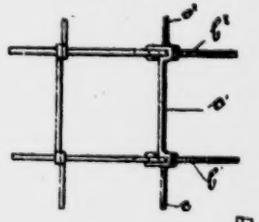


Fig. 2.

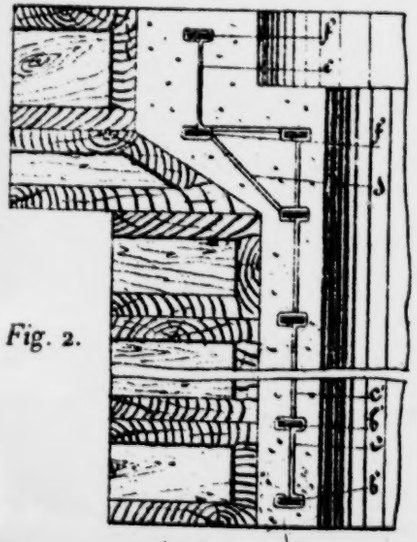


Fig. 10.

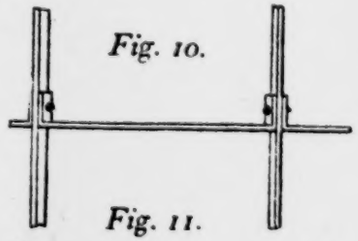


Fig. 4.

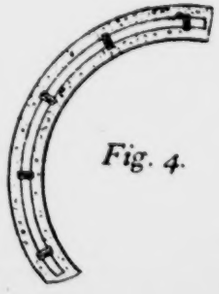


Fig. 11.

Fig. 9.

Zu der Patentschrift

№ 73004.

Translation of German Patent No. 73,004—Robert Kisserling of Hamburg and Max Moller of Altona.

THE PROCESS FOR THE PRODUCTION OF HOLLOW CONCRETE BODIES WITH PROGRESSIVELY FORMED STEEL REINFORCEMENT THEREIN.

In certain cases it is necessary, in order to increase the rigidity of hollow concrete bodies, to form therein steel reinforcing members which are substantially entirely surrounded by the mix- 326
ture of concrete. As soon, however, as these reinforcing members, which may consist of interwoven wire or of series of bars tied tightly to one another, are set up as a unit, which heretofore was the procedure without exception, the advantages which the progressive formation of the concrete hollow body possesses, are very much diminished, since the tamping of the concrete mixtures into the form is made practically impossible thereby.

Hereinafter is described the process in which is carried out the tamping of the concrete mixture into the form (the only way to attain hollow 327
concrete bodies of maximum solidity and uniformity in the inner layers thereof), and in which at the same time, the hollow body thus produced, is provided with steel reinforcement, without preventing the tamping of the concrete.

The process consists essentially therein that the steel reinforcement is built up of single parts which are gradually, according to the progress of the construction brought into connection with one another.

Since, for practical reasons, the means employed in tamping the concrete are actuated in a vertical direction. It will be assumed, therefore,

although it is also conceivable that the tamping may proceed horizontally, that the tamping apparatus is actuated reciprocally in a vertical direction. In such a case it is possible to set up at once in whole, the vertically or nearly vertically extending parts of the reinforcement, or it is possible also to gradually build up the latter of single parts superimposed vertically one over the other, according to the progress of the work.

This last procedure, which is applicable in the production of hollow bodies of the most varied
329 forms and magnitude is now to be disclosed in connection with a typical example. In the brief review of the process for producing a concrete pipe as described in the patent No. 73,003, it is to be hereinafter assumed that it is again a question of production of a concrete pipe, with, however, steel reinforcement therein.

For the production of the latter, the process is substantially as follows: After a layer a of concrete has been tamped about the core and immediately over a base plate and in a space between the core and the lowermost annular section of the mold, the thickness of which layer is
330 in proportion to the size of the pipe to be made there is laid upon this layer a ring b which consists of either one part or of several parts, either interconnected or even, also independent of one another. This ring b, or according to circumstances these individual and independent parts are provided with vertically extending studs c which at the one end thereof are placed under and bent around the ring as is illustrated in Figs. 2 and 3.

The connection between the studs c and the ring b, as well as the form of these parts, is en-

tirely susceptible to various possible embodiments without departing from the purposes thereof. After these several studs have been applied, which by reason of their substantially small cross-section in comparison to the thickness of the pipe itself do not prevent the tamping of the material in any manner whatsoever, the space between the core and the first section of the mold is filled with concrete up to the edge of the latter and the concrete tamped, and there is laid either upon the concrete surface or according to circumstances, upon the studs c, a 332
ring b_1, to which there are already applied studs c_1 or there are now applied such studs thereto by bending the ends thereof about the ring. Before, now, the second section of the mold is applied and the space between that and the core is filled with the concrete mixture, the studs c protruding through the tamped concrete are connected with the ring b_1 in a convenient manner, preferably by bending, which ring is carried by the studs c. Thereupon the second mold section is applied and the space between the latter, the core, and the concrete surface and the layer, is filled with concrete up to the upper 333
edge of the mold section and tamped. After a new ring b_2 has been applied provided with studs c_2, the ends of the studs c_1, as was the case with the studs c and the ring b I now bend about the ring b_2 and the third mold section thereby built up.

In this matter the formation of the pipe as well as the construction of the steel reinforcement proceeds, without, however, that the latter interferes with or makes difficult the tamping of the concrete in any manner whatsoever. If the pipe is to be without a coupling flange,

then the last ring, to which there are attached no upright studs, is not laid at a level corresponding with that of the edge of the last mold section, but is placed several centimeters lower and connected with the studs extending immediately thereunder in the manner heretofore described. The space immediately over the last ring is now filled and tamped with concrete so that the reinforcement is entirely surrounded on all sides by the concrete mixture.

If it is a question of constructing a pipe with
335 a coupling flange, then the process is carried out in the same manner, but there is branched off a side strut d at the height of the upper edge of that mold section which terminates about at the center of the coupling, which side strut has mounted thereon one or two studs e which are connected with the rings f the last of these rings has naturally no studs mounted thereupon. The latter is moreover carried by such studs and is several centimeters below the upper surface of the coupling flange, so that therefore this laterally extending reinforcement is completed surrounded by the mixture.

336 Departing from the above described process, but combining therein the above described principle, there are described in the drawings various further embodiments of this invention.

In Figs. 5, 6 and 7 there is illustrated, in side elevation and in cross-section, such a steel reinforcement, whose upright studs g may consist of one or more interconnected parts. These studs are provided with a series of notches which are adapted to receive a wire h, which is wound upon the studs spirally as the construction progresses.

In Figs. 7b and 7c, are shown advantageous embodiments, in which the wire h is connected

with the studs so as to be capable of resistance in both directions, which is not the case in the embodiments illustrated in Figs. 5 and 7a. The reinforcing structure shown in Figs. 8 to 11 requires, in view thereof, no further disclosure.

The processes described in the patent No. 73-003 and the processes herein disclosed, are extraordinarily similar insofar as in the former the sections of the mold are left off until they were absolutely necessary; the same is the case here with the single parts of the steel structure. The advantages of the processes aside 338
from the fact that the tamping, which cannot be given too much emphasis, can be retained, lie not only in the fact that the rigidity of the whole structure essentially is increased by reason of the reinforcement, but also in the fact that the cement both before and during the setting thereof attains an advantageous density so that the dissembling of the mold and the core as well as the removal of the pipe from the base plate itself, can take place much sooner than in the construction of pipes according to the processes described in the above mentioned patent.

CLAIM: 339

The processes for the production of hollow concrete bodies, as described in patent No. 73,-003 of "material adapted to be tamped" a steel reinforcement formed therein progressively, whose construction takes place in such a manner that such parts thereof, which lie parallel or nearly parallel to the direction of actuation of a tampering apparatus, are either built up or eventually completed, while the parts of the reinforcement extending through said first parts are inserted as the construction proceeds, for the purpose of allowing the free tamping of the material into the mold.

340

Stipulation

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88. Re-issued Letters Patent 14,182.

341

It is hereby stipulated by and between the parties hereto that the annexed abstracts of defendant's Exhibits B and C may be used instead of said exhibits and reproduced in the record on appeal in lieu of said exhibits.

JAS. H. GRIFFIN,
Solicitor for Plaintiff.

FRANCIS E. MURRAY,
Solicitor for Defendant.

342 October 11th, 1918.

343

Abstract of Defendant's Exhibit B

File wrapper and contents of patent No. 841,741.

This patent was granted to George E. Vandenburgh January 22, 1907, on an application filed May 9, 1906, Serial No. 315,959.

The petition and oath are in the usual form.

The specification is exactly as it appears in the patent.

The claims as filed and corrected and cancelled are as appears on the next page. Substituted claims are as in patent.

344

Sub B Oct 30. '06 Sept 27-06

1. A reenforcing bar provided with a spirally disposed coil secured thereto.

" " "

2. A reenforcing bar provided with a spirally disposed coil secured thereto, and a secondary spirally disposed coil extending in the opposite direction to the first mentioned coil.

Oct 30, 06 Sept 27 '06

Cancelled Oct 30 '06

3. A reenforcing bar provided upon one edge with a series of kerfs and integral spurs, and a spiral coil disposed in said kerfs and retained by said spurs.

" " "

4. A reenforcing bar provided with a series of kerfs at opposite sides of the center thereof and disposed toward the ends of the bar, oppositely disposed coils seated in said kerfs, and spurs carried by the bar for retaining the coils in said kerfs.

Sept 27-06

5. A reenforcing bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar.

6. A reenforcing bar provided at opposite sides of its center with spiral coils secured thereto and deflected in opposite directions from the center of the bar, and a secondary spiral coil secured to the bar and extended in the opposite direction to the first mentioned coil throughout the length thereof.

September 25, 1906, the application was rejected by the Patent Office and the action read as follows:

"Claim 1 is rejected on the Swiss patent to:
Muuch, 19,271, C. & F., C. & M.

"Claim 2 is rejected on:
Mueser, 815 617, Mar. 20, 1906 M. R.

"Claim 3 is rejected on the Swiss patent above in view of:
Peabody, 805,663, Nov. 28, 1905, M. R. 350

"Claim 4 is rejected on Peabody.

"Claim 5 is rejected on the Swiss patent above.

"C. C. W. "W. A. Cowles
"Examiner Division 33."

Under date of September 27, 1906, the claims were amended as indicated on the preceding page and then the attorney submitted the following argument:

"The claims have been amended to clearly 351
distinguish over the Swiss patent cited which does not show the spirally coiled strand secured to the bar to prevent lateral movement thereon, and does not have the free coils disposed be-

352 *Abstract of Defendant's Exhibit B*

yond the bar to be embedded in the concrete and form an arch structure of practically the diameter of the coils. In the Swiss patent in Figure 1 a spiral coil is not shown, but the wire is coiled over two rods, as shown in Figure 1^a while in Figure 2 the wire is in an oval form as shown in Figure 2^a. In neither instance can the extended area of applicant's spiral be secured, and in the use of such a spiral it is necessary that it be secured to the bar to prevent lateral displacement when tamping the mater-
353 ial in position. The reference device shows a different form of brace where the wire simply extends between two parallel bars and is only practically of the width of these bars and the diameter of wire thereon. The patent to Mueser merely shows the integral ribs formed on the bar and not a strand extending free thereof for the purpose of applicant's invention so that claim 2 is now believed to clearly define over this patent which is not intended or adapted for the purpose of this invention. The patent to Peabody does not show any spurs forming an enclosing wall for the kerf and adapted thereby
354 to retain the coil in position. As recited in claims 3 and 4 this is a novel means of securing the coils to the bar and should be allowed. An independent discussion of the claims is not believed to be necessary in view of the amendments and the foregoing statement of differences over the references.

"Respectfully submitted,

"E. B. Stocking,
"Attorney."

"September 27, 1906."

October 24, 1906, the application was again rejected the action reading as follows:

"This case has been considered as amended Sept. 27, 1906.

"Claims 1, 3, 4 and 5 are rejected on the Swiss patent of Record, in view of:

Kahn, 768 284, Aug. 23, 1904, M. R.,

which shows shear arms attached to the tension bar by being seated in saw-kerfs and grooves 356
and the metal of the bar compressed by the shear arms to maintain the same in its seat.

"Claim 6 is allowed.

"Does applicant wish the word 'coil' in both places where it occurs in line 2 of claim 2 to be changed to *coiled strand?*

"C. C. W. "W. A. Cowles

"Examiner Division 33."

Under date of October 31, 1906, this application was amended by canceling claims 1, 3, 4 and 5 and inserting claims 1, 2, 3 and 4 as they appear in the patent. Claim 2 was renumbered 357
claim 5, as above stated. The new claims were allowed without change, except that in claim 4 line 4 *coil* was substituted for *coiled.*

The argument which accompanied this amendment reads as follows:

"It is submitted that the claims as now presented clearly distinguish over the references of record which do not disclose applicant's bar. The Swiss patent which is relied upon by the Examiner shows windings carried by parallel rods and not secured to either of the rods so that there is nothing except the frictional contact of

the wire to retain the same against longitudinal movement on the rods, or a lengthwise sliding of the bar or wire coiled thereon. This patent does not show a fair instance of a spiral coil having every convolution extended beyond the bar, and even if one of the rods be removed would not anticipate applicant's invention because the remaining rod not being attached to the coil could not retain it in operative position. The Examiner will certainly concede that a structure which is inoperative to accomplish applicant's
359 functions or advantages cannot be a reference therefor, and even though the Swiss patent be reconstructed it lacks the features now defined by applicant's claims 1 and 2. In this connection it should be noted that Figures 1 and 2 of this patent are separate forms of the invention, as shown at 1^a and 2^a so that the Swiss patent does not show the wire deflected toward the opposite ends of the bar, and surely each convolution of the wire is not secured to the bar at two points. By applicant's structure the wire is held against any uncoiling by slipping of the bar, and also against longitudinal movement relative to the bar so that
360 the spiral strands when embedded in the concrete form a structure extending continuously from the center toward the opposite ends of the bar the strands being so disposed that the coil of one overlapping the supporting area of another thus securing a practically continuous support through the body of the concrete.

"While the patent to Kahn last cited shows a spur pressed upward from the bar, it certainly does not show applicant's kerf extended inward from one edge thereof having the overlapping spur by means of which the coil is re-

tained entirely within the area of the bar and hooked in the kerf so that it cannot be backed out or disengaged therefrom in packing the concrete material in position. The structure of spur which overlaps the coil when in position absolutely retains the latter against any movement relative to the reenforcing bar and being novel should be granted protection.

Respectfully,

"E. B. Stocking

"Attorney." 362

"October 30, 1906."

Under date of November 20, 1906, there was a further action of the Patent Office as follows:

"Responsive to amendment of October 30, 1906.

(*Copy*)

"Claim 2 has been renumbered 5.

"In line 4 of claim 4, 'coiled' should be *coil.*

"The case otherwise, is in condition for allow- 363
ance."

Under date of November 21, 1906, claim 4 was amended as required.

The notice of allowance was under date of December 3, 1906, and acknowledgment of the final fee was sent December 29, 1906, and the patent issued January 22, 1907, as above stated.

364

Abstract of Defendant's Exhibit C

This exhibit is the file wrapper and contents of the reissued letters patent in suit No. 14 182. This application was for a reissue of Vandenburgh's former patent 841,741 which has been considered in connection with Exhibit B. This original patent was dated January 22, 1907. The application for issue was filed July 1, 1916.

The petition is in the usual form. The specification and claims were issued as filed.

The oath reads as follows.

365

"State of California }
"City and County of San Francisco, } ss:

"George E. Vandenburgh, the above named petitioner, being duly sworn, deposes and says that he does verily believe himself to be the original, first and sole inventor of the improvement set forth and claimed in the foregoing specification and for which improvement he solicits a patent; that deponent does not know and does not believe that said improvement was ever before known or used before his invention thereof; that deponent is a citizen of the United States of

366 America, and resides at San Francisco, in the County of San Francisco, and State of California; that deponent verily believes that the letters patent referred to in the foregoing petition and specification and herewith surrendered are inoperative for the reason that the specification is defective and insufficient and that such defect and insufficiency consists in the omission therefrom of present claims 1, 2, 3 and 4, and in the use of the word 'rigidly' in line 1, original claims 1 and 2, and in the statement that the coils are secured to the reinforcing bar at two points in each convolution, lines 2 and 3, original claims 1

and 2, as well as in the use of the word 'end' in line 2, claim 3; that the original specification in no place makes use of the word 'rigidly' with respect to the manner of securing the coils to the bar, and that the bars and coils never were rigidly secured together in any of applicant's constructions, but that they were permanently secured together only, as stated in lines 85 and 86 of the printed copy of the specification; that there is an error in the use of said words two points in that while a single coil is secured to the bar at two points in each convolution that 368 where there are a plurality of coils there is only one more securing point than there are coils, and with respect to the word 'end' used in line 2 of original claim 3, that said error is not in accordance with the facts which are that the spurs on kerfs are on the *edge* of the bar and no where shown to be on the 'end' of the bar in the original drawing, and that the four claims substituted for claims 1, 2 and 3 are more limited than the claims appearing in the specification; that deponent further says that the error which renders said letters patent so inoperative arose from inadvertence, accident or mistake and without any 369 fraudulent or deceptive intention upon the part of deponent, in that he was personally unfamiliar with the prosecution of patent cases and did not fully understand that words used in the claims must be supported by wording in accordance with the specification and that such error arose with respect to claim 1 because of the purely accidental use by the attorney prosecuting the original application of words not in accordance with the construction, and with respect to claim 3 applicant believes that the word 'end' was a mere typographical error for the word *edge*, and he believes

370 *Abstract of Defendant's Exhibit C.*

with respect to claim 1 that he has claimed as his invention more than he had a right to claim as new; that as soon as said errors came to his knowledge and attention, he applied for this reissue, and that he is the sole owner of said letters patent and hereby offers to surrender the original letters patent.

"George E. Vandenburgh.

"Subscribed and sworn to before me, a Notary Public in and for the City and County of
371 San Francisco, and State of California, this 24th day of June, 1916.

"L. H. Anderson.

"Notary Public in and for the City and County of San Francisco, State of California. My commission expires December 27, A. D. 1918."

373

Defendant's Exhibit D

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity 14-88. Re-issued Letters 14,182.

374

STIPULATION.

It is agreed between the parties hereto as follows:

1. That plaintiff has good and sole title to the patent in suit and that the parties are correctly described in the bill as amended.

2. That defendant has been and is manufacturing and selling devices of which Plaintiff's Exhibit 3 is a specimen, the latter having been furnished to plaintiff by defendant for use at the trial of this suit. 375

3. That printed or photographic copies of all letters patent may be used with the same force and effect at the trial as original copies, subject to correction, if necessary, by the originals.

4. That the respective dates of application and issue of said patents are as stated therein.

5. That the translation of the Kisserling German patent No. 73,004 contained in the file of

376 *Defendant's Exhibit D.*

patents marked Defendant's Exhibit A, is a correct translation of said German patent.

6. That copies of the file wrappers and contents of the reissue patent in suit and of the original of which said patent is a reissue, which are marked Defendant's Exhibits B and C respectively, are true copies of the Patent Office records and may be used with the same force and effect as certified copies.

377 7. That excerpts from the depositions of witnesses in the suit of plaintiff against Electric Welding Company in the United States District Court for the Western District of Pennsylvania, which excerpts are marked herein as Plaintiff's Exhibit 4, may be used with the same force and effect as though the said witnesses were called by the plaintiff and so deposed.

8. That Plaintiff's Exhibit 5 typifies the device on which the charge of infringement was based in said suit against Electric Welding Com-
378 pany.

9. That John F. Havemeyer, president of defendant company, if called as a witness, would testify that subsequently to the date of plaintiff's original patent and before the date of application for the reissue patent in suit, defendant commenced to make reinforcements for concrete columns similar to Plaintiff's Exhibit 3; that defendant had no knowledge of plaintiff's alleged invention or of plaintiff's original patent until the same was brought to its attention by a letter dated May 17, 1916, signed by C. P. Griffin, plaintiff's attorney, a copy of which letter is as follows:

Defendant's Exhibit D.

"San Francisco, May 17, 1916.

"Concrete Steel Company,
42 Broadway, New York City, N. Y.

Gentlemen:

I desire to notify your company that certain concrete steel reinforcement material manufactured by you is an infringement of patent No. 841,741, granted to my client G. E. Vandenburgh Jan. 22, 1907. This patent broadly covers the securing of spiral coils to reinforcing bars by means of a kerf cut in the reinforcing bar. Two specimen claims are as follows:

1. In a reinforcing bar, a spiral coil rigidly secured thereto at two points in each convolution thereof and extended beyond and free of said bar at the opposite side therefrom to the securing point.

4. A reinforcing bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar each having an overlapping integral spur projected toward the center of the bar, and a coil disposed in said kerfs and retained beneath said spurs.

This is due notice to you that you must cease the manufacture of any bars or concrete steel reinforcements which in any way infringe this patent, and in event that you fail to discontinue such manufacture suitable action will be taken against you for an injunction and an accounting.

Yours truly,

(Signed) C. P. Griffin."

382 *Defendant's Exhibit D.*

that after that letter was received, a copy of plaintiff's original patent was procured and examined by defendant, and on May 23, 1916, defendant sent a copy of said patent and a copy of said letters to its attorneys, together with the following letter:

"New York, May 23, 1916.

"Mr. L. E. Varney,
%Messrs. Emery, Booth, Janney & Varney,
149 Broadway, City.

383

Dear Sir:

We enclose herewith original letter from C. P. Griffin, Attorney, San Francisco.

We also enclose copy of the Vandenburgh patent, to which this letter refers. We have not replied to the letter and do not know that it is necessary, unless as a matter of courtesy.

In glancing through this patent, we note that it refers to a combination of reinforcing bar with a kerf cut in the bar and a spiral or rod ties in the kerf. It would seem

384

to me that the patent would be limited to the combination of a spiral attached rigidly to a reinforcing bar.

The spirals which we manufacture are made by a combination of coils of wire attached to an angle, which is slotted on one leg. The spiral is not rigidly attached, as is it made collapsible. The angle or spacer is used simply to stiffen the spiral until it is embedded in concrete. In other words, the angle is simply a mechanical device used to hold the spiral in place until the concrete is poured. The angle, however, is not figured

as a reinforcing bar, and the metal used in the angle does not enter into the figured stresses of the column.

I suppose Mr. Griffin might claim that the metal in the angle, whether figured or not, is still a reinforcing metal, but general practice does not allow this to be considered as reinforcement, as loose bars are inserted in the column to take care of the stresses.

If after looking this patent over, it is agreeable to you, I would suggest that you simply write Mr. Griffin and state that you 386 have investigated the matter and find that your clients, the Concrete Steel Company, have not infringed the Vandenburgh patent.

Very truly yours,

CONCRETE STEEL COMPANY,
(Signed) J. W. Havemeyer, Prest.

that said attorneys confirmed defendant in its view, as expressed in said letter of May 23, 1916, as to the apparent limitations of plaintiff's original patent, and that defendant thereafter continued to manufacture said devices in the be- 387 lief that it was free to do so and so notified plaintiff's attorney; that on June 12, 1916, defendant received the attached circular from plaintiff's attorney and sent it together with the following letter to its attorney:

"New York, June 12, 1916.

"Mr. L. E. Varney,
%Messrs. Emery, Booth, Janney & Varney,
149 Broadway, City.

Dear Sir:

I enclose herewith circular letter received from C. P. Griffin, San Francisco, which

388 *Defendant's Exhibit D.*

evidently follows up his previous letter to us.

You will note he shows a column collapsed and also shows a spiral column in which a 'T' section is used for spacer. This apparently would not be in accordance with the patent, which calls for a reinforcing bar with the spiral rigidly attached. The 'T' spacer used simply as a spacer and a stiffener, and I do not know of any cases where the 'T' section is used for structural purposes.

I am sending you this for your records.

389

Yours very truly,

CONCRETE STEEL COMPANY,
(Signed) J. W. Havemeyer, Prest.

that thereafter it heard nothing from plaintiff until about November, 1916, when defendant's president was in Chicago where he learned for the first time that plaintiff's original patent had been reissued whereupon defendant again wrote its attorneys under date of November 9, 1916, as follows:

390

"New York, November 9, 1916.

"Mr. L. E. Varney,
% Messers. Emery, Booth, Janney & Varney,
149 Broadway, City.

Dear Sir:

Sometime ago we took up with you the Vandenburgh patent No. 841,741, which referred to a spiral for a column, using a reinforcing bar as a spacing member. We had a letter from some attorneys on the

Pacific Coast, threatening suit against us, and upon investigating the matter we decided that the spiral we make does not infringe this patent. When in Chicago recently, I found that the Leonard Construction Company were being threatened with suit under this patent and that the patent had been reissued. Can you get a copy of the reissued patent? If so, I would like to have it, so that we can see just what the present claims are.

Very truly yours, 392

CONCRETE STEEL COMPANY,
(Signed) J. W. Havemeyer, Prest.

that thereafter and about January 9, 1917, defendant received the following notice, dated January 3, 1917, from plaintiff's attorney:

"San Francisco, January 3, 1917.

"The Concrete Steel Company,
42 Broadway, New York.

Sirs: 393

Several months ago I wrote your Company relative to the infringement by you of a patent owned by a client of mine, Mr. George E. Vandenburgh.

I am sending herewith a circular to bring the matter more clearly before you.

I have before me your catalogue of Havemeyer Bars, which shows on page 6 a construction mechanically identical with the construction shown in the circular herewith, and I also have before me a letter from your Patent Attorneys denying that you have ever manufactured or infringed the patent.

394 *Defendant's Exhibit D.*

I have just concluded a License Agreement with one of the largest manufacturers in the East on this subject matter, and if it is your desire to fight the matter rather than to give it the consideration justly due it I am content; but, before going to extremes, I wish to submit it to you again, and if any fair minded Patent Attorney will, in view of your circular on Havemeyer Bars, make the statement made to me in the letter from Emery, Booth, Janney & Varney I will drop the
395 whole matter, which certainly is a fair enough proposition to warrant its further consideration.

If you are interested in the matter, and will advise me I will be glad to take it up further with you. If not, I intend to proceed along other lines. The patent is reissue #14182 of August 15, 1916.

Yours truly,

(Signed) C. P. Griffin."

396 that nobody connected with defendant company ever saw a device of the character in suit which was built by plaintiff or by anybody associated with plaintiff; that the devices manufactured and sold by defendant, of which Plaintiff's Exhibit 3 is a specimen, were designed independently by defendant, and were not copied from anybody; that the longitudinal member in each of said devices were primarily designed by defendant as a spacer to hold the spiral strands properly separated during the placing of the concrete, and secondarily as a means for hold-

ing the spiral together during shipment from defendant's plant to the job where it was to be used; that the slotting of the longitudinal member to receive the spiral strands and the subsequent fastening of the strands therein by hammering together the open ends of the slots so that the spiral could be collapsed during shipment and at the same time retained within the slots, was a construction independently worked out by this defendant and particularly without any knowledge of plaintiff's patent or of plaintiff's alleged invention and as a natural and 398 obvious means of securing the spiral to the longitudinal; and that the longitudinal is made as light as it can be to save metal and is not used or figured as a reinforcing bar.

It is stipulated that the foregoing statement of what the said Havemeyer's testimony would be if he were called, may be used with the same force and effect as if the said Havemeyer had been called by the defendant and had so testfied.

JAS. H. GRIFFIN,
Solicitor for Plaintiff. 399

FRANCIS E. MURRAY,
Solicitor for Defendant.

New York, May 8, 1918.

400

Opinion

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,

vs.

CONCRETE STEEL COMPANY,

401 Final hearing in Equity. Action on Claims 1, 2, 3 and 5 of Re-issued patent to plaintiff, No. 14,182. Original patent was No. 841,741, of which the application was filed May 9, 1906, patent issued January 22, 1907, surrendered and re-issue prayed July 1, 1916, re-issue granted August 15, 1916.

J. H. GRIFFIN, for Plaintiff.

L. E. VARNEY, for Defendant.

MEMORANDUM DECISION.

402 A formal statement of the alleged infringement clarifies this situation. Defendant makes and sells a "collapsible spiral" (Deft's Ex. 5, p. 6), used for strengthing concrete construction, consisting of a cylindrical helix of steel wire fitted (usually) to two "spacers" a diameter apart, and each engaging every convolution of the helix, of which the rise is so slight and the engagement with the "spacers" so loose that the construction which is normally stovepipe shape, can by moving the metal rods called "spacers" longitudinally in opposite directions be flattened out and then conveniently crated for transport.

These "spacers" are not re-enforcing bars in the sense that they are calculated addition to the ultimate strength of the steel and concrete structure; their function is only to hold the spiral in place until the concrete is poured—but, of course, they are of metal and do contribute whatever strength they possess—so would any other casual piece of steel.

To this apparatus there are two essentials, one that the helical convolutions be close, and second that the wire be so fastened to the "spacers" that it can turn in place; unless both of these 404 conditions are fulfilled it cannot collapse.

That this is not the exact thing Vandenburgh invented is too plain for argument; the assertion is that a wire spiral fastened to one piece of metal, such as defendant's "spacer", in the manner commercially used by defendant, and intended as an aid to concrete building, embodies the claims in suit; the addition of another spacer is immaterial and collapsibility is a function or attribute of what the claims define.

Whether the claims of the reissue do read on defendant's structure, is not a matter requiring much consideration. If such be the case, it does 405 not prove but only suggests infringement.

Nor, on the other hand, shall I spend time in dwelling on the "paper" nature of this patent. The style of strengthener for concrete now called infringing has been in growing use since 1907, but there is no proof at all that plaintiff has contributed to that growth, unless one is to believe that the mechanical world was moved by Fig. 4, the only portion of the disclosure suggesting even now defendant's device. On this

evidence it is clear that McClure 857,821, which issued a few months after the patent in suit, should have had a vastly greater influence, because its suggestions are so much more distinct.

It is preferred to ask what is always an important and often the vital question—what did Vandenburgh disclose?

His specification has remained substantially the same, since date of application; there were no changes of substance in the office and the reissue was sought only to procure a change of
407 claims. The invention has always been described as a "reinforcing *bar,*" which is to be "embedded in the plastic body to be supported thereby." Bars were old, therefore novelty in construction must be shown and it is disclosed that this bar is to be provided with "*one or more* spirally disposed coils *secured* to the bar," and forming a *truss* within the body of concrete." This securing of coils to bar may be "in any desired manner," but the preferred and disclosed means is a "series of Kerfs in one face of the bar *inclined away* from the *center of the bar* towards the *op-*
408 *posite ends* thereof"; in one of which Kerfs each convolution of the wire coil was inserted and the spur or lip of each Kerf "*forced downward* upon the coils;" thus the hammered down Kerfspurs "*permanently* retain" the wires "*in position.*" There was nothing new about this method of retention (Clark 589,593), while as for the mere act of fastening by any means a rigid metal bar longitudinally along a cylindrical helix of wire, I have only to look at the spring holder for pens

and pencils now before me and in the same use on my desk for twenty years last past.

Evidently, therefore, the patent could not generically cover a style of construction of which the elements are a coil of wire combined with any sort of metal rod secured to each other in any way as often as the periphery of the spiral touched the longitudinally placed rod. Unless the disclosure does reveal this fundamental and novel thought, it may be doubted whether what defendant does it within any justifiable range of equivalency; but decision is grounded on nar- 410
rower consideration.

I have quoted substantially all the verbal description of invention, and as soon as the drawings are examined it is seen just what Vandenburgh meant by a "truss," and exactly how he made one, and why he wanted it strong, fixed and rigid. Fig. 1 and its detail Fig. 3, with interlacing coils pointed away from the middle point of the ultimate completed construction, is a true truss frame, firm and rigid (except for probable resiliency or elasticity of wire), before any concrete poured. Fig. 4 shows a single wire, 411
a cheaper and weaker device, but identical in theory. This is Vandenburgh's invention; he never disclosed collapsibility; what he shows will not collapse; what he does show bears scarcely a remote resemblance to what defendant makes and sells.

It is urged, however, that whether Vandenburgh saw the possibilities of a mere spiral guide for concrete or not, he disclosed the fact. If so, it must be by Fig. 4 alone. But, as said above, this is called "a modified form using one coil";

using one coil for what? Of course, for the same purposes and in the same manner as he preferred to use a double coil; *i, e.*, so as to be rigid, truss-like and non-collapsible.

Turning to the reissue, it is found that claims 1 and 2 originally called for a spiral coil "rigidly" secured to the reinforcing bar; as reissued the phrase is "permanently" secured. The evidence makes it plain that this change was made to catch manufacturers like defendant, but I shall not consider intervening rights because it is
413 thought clear that *rigidly* is exactly what the patentee meant. This is seen from the nature of his "truss" and the representations made in argument to the examiner. (Original file wrapper, Amendments A and B.)

Claims 5 (original 4) and 3 are in too general language. They go beyond the disclosure, exceed the invention and are false claims unless construed to mean by *"retained"* rigidly fixed in place, and (5) by "Kerfs disposed diagonally," Kerfs incline half one way and half the other—substantially as shown.

414 In result, it is held that the reissue was unlawful as to claims 1 and 2 if "permanently secured" differs in meaning from "rigidly secured" because the specification meant "rigidly secured;" whether this invalidates the reissue need not be discussed. Further held that Claims 3 and 5 are not infringed by defendant, and finally held that the only invention revealed by the specification is the exact construction described and pictured in Figs. 1 and 6.

Bill dismissed with costs.

C. M. Hough,
U. S. C. J.

May 13, 1918.

415

Final Decree

At an Equity Term of the United States District Court for the Southern District of New York held in the Woolworth Building in the Borough of Manhattan of the City of New York on the 27 day of May, 1918.

Present—Hon. Charles M. Hough,
Circuit Judge.

416

George E. Vandenburgh,
Plaintiff,
vs.
Concrete Steel Company,
Defendant.

In Equity.
14-88.

This cause came on to be heard at this term, and was argued by counsel, and thereupon, upon consideration thereof, it was Ordered, Adjudged and Decree, that the bill of complaint be dismissed with costs.

417

C. M. Hough,
U. S. C. J.

Approved as to form:
James H. Griffin,
Solicitor for Plaintiff.

Lucius E. Varney,
Solicitor for Defendant.

418

Petition for Appeal

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH, Plaintiff, VERSUS CONCRETE STEEL COMPANY, Defendant.	In Equity 14-88. Re-issued Letters Patent 14,182.

419

The plaintiff in the above entitled suit believing himself aggrieved by the decision entered after final hearing in the above entitled case May 13th, 1918, dismissing plaintiff's Bill of Complaint with costs:

Comes now by his solicitors and counsel James H. Griffin and Carlos P. Griffin, and petitions said court for an order allowing plaintiff to appeal from said decree to the Honorable the United States Court of Appeals for the Second Circuit, under and according to the laws of the United
420 States in that behalf made and provided, and also for an order fixing the sum of security which plaintiff shall give and furnish upon said Appeal.

Notice is hereby also given to counsel for defendant of this petition.

JAS. H. GRIFFIN,
Solicitor.

(Sgd.) CARLOS P. GRIFFIN,
Of Counsel.

Dated: June 1st, 1918,
San Francisco, Cal.

421

Assignment of Errors on Appeal

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff,	In Equity 14-88
VERSUS	Reissued Letters Patent 14,182.
CONCRETE STEEL COMPANY, Defendant.	

422

Now comes the plaintiff, above named, by its solicitors, and specifies and assigns the following as errors upon which he will reply on his appeal to the United States Circuit Court of Appeals for the Second Circuit from the Decree of United States District Court for the Southern District of New York, filed May 13th, 1918, in which plaintiff's Bill of Complaint was dismissed with costs.

FIRST: Error is assigned in not adjudging that the exact thing defendant invented consists of a 423
concrete reinforcement having helical convolutions so fastened to the spacers that they can turn in place.

SECOND: Error is assigned in that it is not held, adjudged and decreed, that defendant's structure is an infringement even though the claims of the reissue be read on defendant's structure.

THIRD: Error is assigned in the holding that the spring holder for pens and pencils is relevant to reinforced concrete construction.

424 *Assignment of Errors on Appeal*

FOURTH: Error is assigned in the holding that the inventor wanted to make a truss * * * "rigid."

FIFTH: Error is assigned in the holding that "Figure 1 and its detail Figure 3 * * * is firm and rigid * * * before any concrete is poured."

SIXTH: Error is assigned in the holding that "Vandenburgh * * * never disclosed collapsibility," further holding that "what he shows will
425 not collapse" as well as in the further holding that "what he does show bears scarcely a remote resemblance to what defendant makes and sells."

SEVENTH: Error is further assigned in the holding that the reinforcing disclosed in the patent is in any way or has anything to do as "a mere spiral guide for concrete."

EIGHTH: Error is further assigned in the holding that the structure of figure 4 of the patent for a structure before the concrete is poured "*so as to be rigid,* truss-like and non-collaps-
426 ible."

NINTH: Error is further assigned in holding that Vandenburgh's patent has a property, *i. e.,* "non-collapsibility" which it does not have and which it was not intended to have, and which was not referred to in the specification of the patent.

427

TENTH: Error is assigned in the holding that the word "rigidly is (was) exactly what the patentee meant" as used in his claim 1.

ELEVENTH: Error is further assigned in the holding that "claims 5 and 3 are in too general language," the error is further assigned in the holding that said claims "go beyond the disclosure, exceed the invention and are false claims unless construed to mean by 'retained' rigidly fixed in place."

428

TWELFTH: Error is further assigned in the holding that "kerfs disposed diagonally" means "kerfs inclined one-half one way and half the other substantially as shown."

THIRTEENTH: Error is further assigned in the failure to make a definite holding as to the lawfulness or "unlawfulness" of the reissue patent.

FOURTEENTH: Error is further assigned in the holding that the "reissue was unlawful as to claims 1 and 2 if 'permanently secured' differs in meaning from 'rigidly' secured.' "

429

FIFTEENTH: Error is further assigned in the holding that "claims 3 and 5 are not infringed by defendant."

SIXTEENTH: Error is further assigned in the holding that plaintiff's "only invention revealed by the specification is the exact construction described and pictured in figures 1 and 6."

430 *Assignment of Errors on Appeal*

SEVENTEENTH: Error is further assigned in not adjudging that the claims of plaintiff's patent are all valid with respect to any of his constructions disclosed in the patent and in not adjudging and decreeing that defendant infringes claims 1, 2, 3 and 5, and in not adjudging that plaintiff have an injunction and an accounting from defendant.

JAS. H. GRIFFIN,
Solicitor.

431

CARLOS P. GRIFFIN,
Of Counsel.

San Francisco, Cal.,
June 1st, 1918.

433

Order Allowing Appeal

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff,	In Equity. 14-88.
VERSUS	Reissued.
CONCRETE STEEL COMPANY, Defendant.	Letters Patent 14,182.

434 In the above entitled action in equity, the plaintiff having filed his petition for an order allowing an appeal from the decree of this court made and entered in this action on May 13th, 1918, dismissing plaintiff's Bill of Complaint with costs, and plaintiff having filed his assignment of errors.

Now, upon motion of James H. Griffin, solicitor for plaintiff, it is hereby ordered that said appeal be, and is allowed to plaintiff, to the United States Circuit Court of Appeals for the Second Circuit from the said decree dismissing plaintiff's Bill of complaint with costs, and that the 435 amount of plaintiff's bond for said appeal be, and the same is hereby fixed in the sum of Two hundred and fifty dollars ($250).

It is further Ordered, that upon the filing of such security, a certified transcript of the record and proceedings herein be forthwith transmitted to the said United States Circuit Court of Appeals for the Second Circuit in accordance with the statutes and equity rules of the Supreme Court of the United States.

Dated, Oct. 5, 1918.

AUGUSTUS N. HAND,
Judge.

436

Citation

By the Honorable Augustus N. Hand, one of the Judges of the District Court of the United States for the Southern District of New York, in the Second Circuit.

To Concrete Steel Company, Defendant. GREETING:

YOU ARE HEREBY CITED and admonished to be and appear before a United States Circuit Court of Appeals for the Second Circuit, to be holden at the Borough of Manhattan in the City of New
437 York, in the District and Circuit above named, on the 7th day of November, 1918, pursuant to a Petition for Appeal and Assignment of Errors filed in the Clerk's Office of the District Court of the United States for the Southern District of New York, where George E. Vandenburgh is the appellant and plaintiff and you are appellee, to show cause, if any there be, why the errors in said appeal mentioned should not be corrected and why speedy justice should not be done in that behalf.

GIVEN UNDER MY HAND at the Borough of Manhattan, in the City of New
438 York, in the District and Circuit above named, this 8th day of October, in the year of our Lord One Thousand Nine Hundred and Eighteen, and of the Independence of the United States the One Hundred and Forty-third.

AUGUSTUS N. HAND,
Judge of the District Court of the United States for the Southern District of New York, in the Second Circuit.

Service acknowledged this 9th day of October, 1918.

LUCIUS E. VARNEY.

439

Stipulation

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity. 14-88 Reissued Letters Patent 14,182.

440

IT IS HEREBY STIPULATED by and between the parties hereto that the record on appeal shall consist of the following and nothing else:

1. Pleadings.

2. Minutes of the trial.

3. Paper exhibits.

4. Opinion.

5. Decree. 441

6. Appeal papers, including stipulations.

JAS. H. GRIFFIN,
Solicitor for Plaintiff.

LUCIUS E. VARNEY,
Solicitor for Defendant.

October 8th, 1918.

442

Stipulation

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee.

443

IT IS HEREBY STIPULATED AND AGREED, that the foregoing is a true transcript of the record of the said District Court in the above entitled matter as agreed on by the parties.

Dated, December 10, 1918.

JAS. H. GRIFFIN,
Attorney for Appellant.

LUCIUS E. VARNEY,
Attorney for Appelee.

444

445

Clerk's Certificate

United States of America,
Southern District of New York. } ss:

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee.

446 I, Alexander Gilchrist, Jr., Clerk of the District Court of the United States of America for the Southern District of New York, do hereby certify that the foregoing is a correct transcript of the record of the said District Court in the above entitled matter as agreed on by the parties.

IN TESTIMONY WHEREOF, I have caused the seal of the said Court to be hereunto affixed, at the City of New York, in the Southern District of New York, this 10th day of December, in the year of our Lord one thousand nine hundred and eighteen, and of the Independence of the said 447 United States the one hundred and forty-third.

ALEX. GILCHRIST.
Clerk.

(Seal)

448

Opinion

UNITED STATES CIRCUIT COURT OF APPEALS

FOR THE SECOND CIRCUIT

No. 172—October Term, 1918.

Argued March 3, 1919. Decided April 16, 1919.

449 GEORGE E. VANDENBURGH,
Plaintiff-Appellant,

vs.

CONCRETE STEEL COMPANY,
Defendant-Appellee.

Appeal from the District Court of the United States for the Southern District of New York.

Before WARD, ROGERS and MANTON, Circuit Judges

450

James H. Griffin, for Plaintiff-Appellant.
Lucius E. Varney, for Defendant-Appellee.

WARD, Circuit Judge.

U. S. Reissued Patent 14182 to George E. Vandenburgh for a concrete reinforcing bar was held void for want of invention by the District Court

for the Western District of Pennsylvania in the suit of *Vandenburgh v. Electric Welding Co.*, while the court below dismissed the bill in this case against the Concrete Steel Company for non-infringement. Both courts held that the original patent did not contemplate collapsibility of the structure because the spiral coil was described as rigidly fixed by kerfs and spurs on the reinforcing bar. For this reason it was held that claims 1 and 2 of the reissue which were intended to cover collapsibility of the structure were invalid as too broad. We agree in this conclusion. 452

But claim 3 of the reissue is literally the same as claim 3 of the original patent and claim 5 of the reissue is literally the same as claim 4 of the original patent. These claims should be construed consistently with the specifications, which are also literally the same in each patent, as meaning that the spiral coil is rigidly connected with the longitudinal bar at each point of contract. So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the body of the concrete resisting lateral and longitudinal strains 453 and which can be more cheaply manufactured than if the spiral were riveted or welded to the bar at each point of contract.

The defendant's witness Cummings frankly admits that this form of reinforcing structure was new in cement work and has come into general use. The fact that claims 1 and 2 of the reissue are invalid as too broad does not invalidate claims 3 and 5, *Gage v. Herring*, 106 U. S., 640,

646. The defendant's structure when set up to receive the concrete is exactly the same as plaintiff's except that the spiral coil is not rigidly fixed by kerfs and spurs on the bar. This enables the structure to be collapsed when not in use, a commercial improvement for purposes of shipment but which does not justify the defendant's appropriation of the plaintiff's structure.

The decree is reversed with half costs to the plaintiff.

457

Order for Mandate.

At a Stated Term of the United States Circuit Court of Appeals, in and for the Second Circuit, held at the Court Rooms in the Post Office Building in the City of New York, on the 26th day of April, one thousand nine hundred and nineteen.

Present:

HON. HENRY G. WARD,
HON. HENRY WADE ROGERS, 458
HON. MARTIN T. MANTON,
Circuit Judges.

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee.

Appeal from the District Court of the United States for the Southern District of New York. 459

This cause came on to be heard on the transcript of record from the District Court of the United States, for the Southern District of New York, and was argued by counsel.

460 *Order for Mandate*

On Consideration Whereof, it is now hereby ordered, adjudged and decreed that the decree of said District Court be and it hereby is reversed with one-half costs to the appellant. It is further ordered that a Mandate issue to the said District Court in accordance with this decree.

H. G. W.,
M. T. M.

Endorsed:

461 United States Circuit Court of Appeals—Second Circuit—G. E. Vandenburgh—v.—Concrete Steel Co.,—Order for Mandate—

United States Circuit Court of Appeals—Second Circuit—Filed April 28, 1919.—William Parkin, Clerk.

UNITED STATES OF AMERICA,
Southern District of New York, ss:

I, William Parkin, Clerk of the United States Circuit Court of Appeals for the Second Circuit, do hereby Certify that the foregoing pages, numbered from 1 to 154 inclusive, contain a true and complete transcript of the record and proceedings had in said Court, in the case of George E. Vandenburg, Plaintiff-Appellant, against Concrete Steel Company, Defendant-Appellee, as the same remain of record and on file in my office.

In testimony whereof, I have caused the seal of the said Court to be hereunto affixed, at the City of New York, in the Southern District of New York, in the Second Circuit, this 17th day of January in the year of our Lord One Thousand Nine Hundred and twenty-two and of the Independence of the said United States the One Hundred and forty-sixth.

[Seal of the United States Circuit Court of Appeals, Second Circuit.]

WM. PARKIN,
Clerk.

Interlocutory Decree on Mandate

At a Stated Term of the United States District Court, held in and for the Southern District of New York, at the Post Office Building this 15th day of May, 1919.

Present:

HON. AUGUSTUS N. HAND,
United States District Judge. 2

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity No. 14-88. Reissued Letters Patent No. 14,182.

WHEREAS the decree heretofore entered in the above-entitled action was by the United States Circuit Court of Appeals for the Second Circuit affirmed as to claims 1 and 2, and reversed as to claims 3 and 5 of reissued letters patent in suit 3 No. 14,182 and a mandate pursuant thereto has been filed in this court on April 29, 1919,

4 *Interlocutory Decree on Mandate.*

IT IS ORDERED, ADJUDGED AND DECREED:

(1) That the said mandate be and hereby is made the order and decree of this Court.

(2) That the final decree of this Court be vacated and the appeal bond of the plaintiff cancelled.

(3) That at the times mentioned in the bill of complaint, George E. Vandenburgh was and is
5 now the sole owner of United States reissued letters patent No. 14,182, granted August 15, 1916. That claims 1 and 2 of said reissued letters patent are void and of no effect; that claims 3 and 5 of said reissued letters patent are good and valid in law; that the defendant has infringed the same.

(4) That the plaintiff recover from defendant the damages which said plaintiff has suffered and such increase thereof as may be allowed by this court pursuant to law and the profits which the defendant has realized by reason of the infringe-
6 ment.

(5) That a permanent injunction issue out of and under the seal of this Court and enjoining the defendant, its agents, employees, workmen and others acting for it and in its behalf from a further infringement of claims 3 and 5 of said reissued letters patent.

Interlocutory Decree on Mandate.

(6) That the cause be referred to William Parkin, Esq., Standing Master in Chancery of this Court, to take and report to the Court an account of damages sustained by the plaintiff and of the profits received by the defendant from the said infringement, with power in the Master to compel the production of books and papers necessary for an accounting.

(7) That the defendant and its representatives be required to attend before such Master at convenient times.

(8) That the plaintiff, have and recover from the defendant one-half of its costs and disbursements in the Circuit Court of Appeals, as taxed in the sum of $78.48.

AUGUSTUS N. HAND,
U. S. D. J.

10

Master's Order

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH, Plaintiff, against CONCRETE STEEL COMPANY, Defendant.	In Equity No. 14-88.

11

TO THE ABOVE DEFENDANT:

Pursuant to the Order of this Court entered May 15th, 1919, I hereby direct you to file with me within twenty (20) days from the date hereof, after serving a copy on the plaintiff, a statement of account, showing:

1. The number of articles which infringed claims three (3) and five (5) of Reissued Letters patent in suit #14182, made or sold by you, the date of each such sale, and the person to whom each article was sold.

12

2. An itemized statement showing the cost of manufacturing each of said articles.

3. An itemized statement showing the cost of selling each of said articles.

13

4. An itemized statement of all other costs, if any, entering into the manufacture or sale of such articles.

5. The profit derived from the sale of each of such articles.

Dated, New York, May 16th, 1919.

WM. PARKIN,
MASTER.

14

Copy received May 16, 1919.
L. E. VARNEY,
Sol. for Def.

16

Case

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff,
against
CONCRETE STEEL COMPANY,
Defendant.

17

Before: WILLIAM PARKIN, ESQ., Master.

Hearing before the Master pursuant to Master's order and motion for stay.

Motion for stay has been denied.

APPEARANCES:

THE MASTER;

18 O. ELLERY EDWARDS, ESQ., and CARLOS P. GRIFFIN, ESQ., for Plaintiff.

THOMAS J. JOHNSTON, ESQ., and
MESSRS. EMERY, BOOTH, JANNEY & VARNEY, (Mr. Johnston) for defendant.

It is stipulated by and between counsel that the stenographer reporting this case for the use of

the Master shall furnish copies one each to counsel for plaintiff and counsel for defendant; the plaintiff will pay for the Master's copy and for his own copy, and the defendant will pay for its copy, upon delivery or upon rendering the bill. The expense will be adjusted in settlement of the cost. This is to apply to the taking of plaintiff's proofs. When the defendant's proofs are taken the Master's copy will be paid for by the defendant.

19

Mr. Edwards: I except to each and every item of the statement of account filed before the Master, and ask for the production of the witnesses as directed by the Master's order.

20

Mr. Johnston: I move to quash the Master's order dated October 6, 1919, because it is contrary to law and puts a burden of proof upon the defendant; because it is contrary to practice authorized and required by Supreme Court Rule in Equity No. 63, and also Rule 62 and the decisions interpreting them; and because it was entered without notice to the defendant, or an opportunity to be heard thereupon, and is therefore void. In this connection I call the attention of the Master to the case of Beckwith v. Malleable Iron Range Co., 207 Fed., 848, a decision in which Judge Geiger, of the District Court in Wisconsin, interprets the rule and states what he regards to be the correct practice.

21

I desire to say, however, that I think the plaintiff will be entitled not only to file exceptions putting the account in issue at this time, but also

to file an exception based upon any testimony which he may take, if proper ground of exceptions shall be developed by the testimony and is not apparent from the account itself. With this exception I think the case referred to outlines a correct practice. I believe it is undoubted that the burden of proof is on the plaintiff, and that he must close his case before the defendant either is required or can be required to examine witnesses at all. This is quite aside from the question of producing any person and employe of the
23 defendant whom the Master may direct to be produced, as we will gladly waive subpoena, but such witnesses when produced are the plaintiff's witnesses and must be examined with that understanding. After the plaintiff's case is closed we may or not be required to put in testimony, but until that time any order requiring us, as does this, to produce "your" (that is the defendant's) witnesses, appears to me to be void.

Mr. Griffin: In order that this record may be clear upon this subject, I insist that this hearing be proceeded with forthwith and continuously. I
24 am in New York from San Francisco at great expense both to myself and to my client; during the time I am away my office is practically closed. This hearing is for the purpose of examining the account heretofore filed by defendant in response to an order of the Circuit Court of Appeals, overruling a decree heretofore entered by the District Court for the Southern District of New York, and nearly six months has expired since

that decree was overruled so that defendant has had ample time within which to prepare and submit a proper account. 25

Mr. Johnston: That account has been prepared and submitted, and stands so far without exception.

Mr. Griffin: The account is objected to for sundry reasons, the principal of which are that the items do not agree among themselves, and that it is impossible to ascertain therefrom all of the facts relevant to the costs and sales price of the materials therein referred to. It is also 26 objected to upon the ground that it is incomplete. Further objections will be reserved to be made whenever ascertained.

Mr. Edwards: I would like to call attention of the Master to Rule 62, which gives him full control of these proceedings.

Mr. Johnston: That rule was also dealt with by Judge Geiger in this decision.

Mr. Edwards: I ask that the Master rule that the proceedings go forward forthwith and without delay.

The Master: In view of Mr. Griffin's attendance here from San Francisco, I think the pro- 27 ceedings should go ahead without any delay. The plaintiff has a right to examine the accounting parties under Rule 62, and I therefore direct that the defendant produce before me the party who prepared and swore to the account which has been filed with me, for examination by the plaintiff.

28 It is stipulated by and between the parties hereto that Carlos P. Griffin, Solicitor for Plaintiff, if called would testify as follows:

I am familiar with the facts of this case, and I have been identified with the same since it began, and I have been familiar with the licensing of people under the patent in suit, and attended to all matters incidental thereto, and I am the only person who has full knowledge of such licenses. I further state that only one such license was granted during the time covered by this
29 accounting, and it was to the Concrete Steel Products Company, and was at the rate of $3 per ton. They have paid for something less than 100 tons of spirals made in accordance with the invention of the patent in suit. This is the only license of any kind which was granted on or subsequent to the date of reissue of the patent in suit and to and including the date of the filing of the injunction in this case, or the date of the filing of the account; it is true of both cases.

Adjourned to Saturday morning, at 10 a. m.

It is directed that the party who prepared the account attend at that time.

Mr. Johnston: I give notice that it is impossible to comply with the order, on account of work in my hands in preparation for the hearing of cases in the Courts of Appeals, both in the Second Circuit and in the Third Circuit. If I can find anyone with sufficient familiarity with the case to take my place I will do so, and I will notify opposing counsel and the Master, but at the present time I know of no one who can do so. I think the order is beyond the power of the Master.

34 *R. W. Barbour—For Plaintiff—Direct.*

Vandenburgh v Concrete Steel Co.

New York, October 11, 1919.
10 a. m.

Before: WILLIAM PARKIN, ESQ., Master.
Met pursuant to adjournment.

Present, Mr. Edwards, Mr. Griffin and Mr. Whittemore.

35

R. W. BARBOUR, being duly sworn and examined as a witness for plaintiff, testifies as follows:

By Mr. Griffin:

Q1. By whom are you employed? A. The Concrete Steel Company.

Q2. In what capacity? A. In the sales department.

36 Q3. To what extent do you have knowledge of the sales department of the Concrete Steel Company? A. I handle the details of the sales of the New York office.

Q3a. Where do you sell from the New York office? A. I don't know as I just understand.

Q4. What territory does the New York office sell into? A. In the New York district.

Q5. And you have charge only of the New York sales? A. I wouldn't put it that way; I

37

would not say I have charge of the New York sales. I have charge of the details in connection with the sales department in the New York territory.

Q6. The products sold in the New York office are sent to outside territory as well? A. Oh, yes.

Q7. Into what territory are they sold? A. Wherever the job happens to be.

Q8. So that the New York office practically covers the entire field of endeavor of the Concrete Steel Company? A. I would hardly say 38
that, no, because contractors in the New York district as a rule have jobs around New York, or adjacent to New York; they are apt to.

Q9. Is there another sales office of the Concrete Steel Company than the one you are employed in? A. We have other sales offices.

Q10. Where? A. They are distributed in different parts of the country.

Q11. Where, will you give a list of them? A. One in Philadelphia, Birmingham, Boston, Chicago, Cleveland and Syracuse.

Q12. Any in Youngstown? A. No, sir, there 39
is no sales office in Youngstown.

Q13. Where are the fabricating plants located? A. What do you mean by fabricating plants?

Q14. Plants where the steel is produced in the form in which you sell it? A. We do very little fabricating; it is mostly Havemeyer.

Q15. You make spiral slotted bars? A. Yes, we do—coil spiral.

40 *R. W. Barbour—For Plaintiff—Direct.*

Q16. And you do the slotting of the bars that hold the spirals in position? A. Yes.

Q17. Where are the plants that slot those bars located? A. Camden and Youngstown.

Q18. Any other? A. I think that is all.

Q19. Is there any work at Staten Island? A. No, sir.

Q20. Have you a plant of any kind at Staten Island? A. Not to my knowledge, unless it has been recently acquired and I have not been informed.

41 Q21. How long have you been with this company? A. Four years last May.

Q22. Are you fully conversant with the materials made by the Concrete Steel Company? A. In a general way, yes, as a man connected with the sales organization would have to be, to a certain extent.

Q23. Are you acquainted with persons in the sales departments of the other offices? A. Yes, sir.

Q24. Can you give me the names of those persons who would be likely to know more about this

42 than you? A. No, I don't think they would know anything more about it than I do.

Q25. Can you give me the names of those people? A. No, I can't give you the names of anyone in the sales organization that would know more than I about it.

Q26. Can you give me the names of persons with each organization so that I can ascertain from them what each department is doing? A. You mean the different district sales managers?

Q27. The different sales managers? A. Yes, I can give you those names.

Q28. Will you give them to the stenographer? A. I don't know whether I can give the initials: Mr. Dale, the Philadelphia district sales manager; Mr. Piez is the district sales manager in the Birmingham office; Mr. Lyon, either Lyon or Lyons I don't know which, is the district sales manager in the Boston office; and Mr. Barnett is,—I think his title is western sales manager.

Q29. At what office? A. Chicago. 44

Q30. And Boston? A. I have given Boston, Mr. Lyon.

Q31. What are the materials made by the Concrete Steel Company, that is, give me a full list of the materials produced? A. You mean that we manufacture?

Q32. That you manufacture and sell? A. I was going to say we really don't manufacture anything, that is not the raw material.

Q33. I am not concerned with that; what does the company do? A. We are distributors of Havemeyer bars; we sell spiral wire, we sell certain other products which we call specialties. 45

Q34. What are the specialties? A. Different devices for holding bars in place.

Q35. Of what character? A. They are small wire devices.

Q36. Do you know what the percentage of the business done by the company in spiral bars is to the other portions of the business? A. No,

sir, I don't; comparatively small; further than that I don't know.

Q37. Would you say it was 10%? A. I would not want to say because I could not truthfully answer; I don't know.

Q38. You understand what is the subject matter of this action, do you not, collapsible spirals? A. Yes, sir, spirals.

Q39. You ship those spirals referred to in this report—or have you seen the report? A. I haven't no, sir.

47 Q40. Have you seen the report of this matter prepared by Mr. Harry Bahr? A. I have not.

Q41. In any event, these spirals are shipped collapsed, connected to some longitudinal bars, you understand that to be the subject matter of this suit? A. I understand that to be the subject matter of this suit, but the spirals are not all shipped in that way, not in my territory.

Q42. What percentage are shipped in any other way? A. You mean the territory I know about, that is within New York City or a radius of 25 miles of New York City?

48 Q43. Where you are selling? A. In New York City or a radius of 25 miles from New York, they ship what we call field assembled, that is, the coil wire is shipped, it is coiled to diameter and shipped separate as a coil then the angles are punched and shipped separate, that is on account of a restriction.

Q44. Assembled by you or assembled by the contractor? A. By the contractor on the job,

what we call field assembly; that is on account of a restriction, I think it is, Metal Lathers Union; they won't allow us—they won't allow I don't know as I should say "us", but they won't allow the contractors to use spiral in any other way in New York City or within radius of 25 miles of New York.

Q45. What percentage did you say was shipped knocked down for field assembly, what percentage collapsed out of all that are sold in the New York office? A. Most of the spirals shipped from the New York office, a greater 50
part are used in New York City or within a radius of 25 miles of New York, because as you probably know a contractor does not like to take a job very far from his home office.

Q46. Are you still engaged in shipping spirals knocked down and with the slotted bars for field assembly? A. What we call field assembly?

Q47. Yes? A. Yes, sir, that is the loose coils.

Q48. Together with the notched bars for field assembly? A. What do you mean, sometimes they go in the same shipment, sometimes not.

Q49. To the same contractor? A. Oh, yes, 51
to the same contractor.

Q50. How much business has been done in spirals, to your knowledge, out of the New York office since August 15th, 1916? A. Since August 15, 1916?

Q51. Down to the time of the injunction, say July 1st? A. I couldn't say, it would be a hard thing to say.

52 *R. W. Barbour—For Plaintiff—Direct.*

Q52. Have you access to any figures? A. We could get them, yes, sir.

Q53. Have you any personal access to such figures? A. Through others in the office.

Q54. Are you familiar with the steel prices throughout the period from August 15, 1916, down to July 1, 1919? A. What kind of steel?

Q55. Prices of spiral steel reinforcing? A. I couldn't recall them.

Q56. Have you access to any books or information that you would be able to produce the
53 prices of spiral steel and the slotted bars throughout that period? A. I could go back over the orders, yes, sir.

Q57. Could you ascertain for me the amount of spirals shipped by the Concrete Steel Company since August 15th, 1916, set up, and the amount of spirals sold coiled and with slotted bars to be set up by the contractor in the field? A. Yes, sir.

Q58. Will you do so and have that figure at our next hearing? A. It would take some time, how soon is the next hearing?

54 Q59. Next week, Tuesday? A. I will try to.

Mr. Griffin: In order that the record may be straight, I will ask that the Master direct the witness to produce the figures for the spirals sold connected to the bars, and for the spirals sold separate from but with slotted bars to be so connected in the field, at the earliest possible date.

Mr. Wittemore: There is no objection to this if the order is restricted to

55 spirals and bars which the Concrete Steel Company knew were to be assembled to produce the Vandenburgh combination. It is of course obvious to the Master that coiled wire and slotted bars are standard articles of commerce.

The Master: I will direct the witness to produce the statement so far as it relates to any combination which the company knew, or had reason to believe was to be used in that combination.

56 Mr. Griffin: I will ask the witness to produce at our next hearing figures showing the number of tons of spirals connected to the longitudinal bars shipped by his company, and also the number of tons or spirals shipped by his company in conjunction with or to the same job with notched bars for holding those spirals and to be set up in the field by the contractor, and the date of each shipment, covering the whole operations of the company.

The Master: I so direct.

57 Mr. Whittemore: I would like to call the attention of the Master to the fact that this witness is in the New York sales office and has no knowledge of sales other than those made in his office.

The Master: There are others who can make up the statements.

Q60. When was the last shipment, to your knowledge or recollection, of spiral coils, separate? A. What do you mean by bars?

Q61. Notched bars? A. We don't notch any bars.

Q62. Where do you get them? A. We don't notch bars.

Q63. You notch angles? A. Yes, sir, angles; I have to make that distinction; we never notch bars.

Q64. When was the last shipment of spirals and notched angles shipped separate to any job? A. I couldn't give the exact date, not from memory.

59 Q65. Who was it sent to? A. I don't know that I could say that.

Q66. Where was it sent? A. The New York City section.

Q67. Within a week? A. Well, I couldn't say.

Q68. Within two weeks? A. I would rather refer to my records before I answer that.

Q69. When was your last sale? A. I made a sale the other day of notched angles, no spiral wire at all; the contractor was going to supply the spiral wire.

Q70. When was that, a week ago? A. I should say about a week ago, yes; of course there was

60 no wire sold in connection with that.

Q71. When was the most recent sale previous to that? A. I sold coiled wire—I couldn't say, I would not want to answer without referring to my records.

Q72. Is there anybody in the sales department who knows more about the sales than you do? A. You mean the New York sales?

Q73. The New York sales? A. I don't think so.

61

Q74. And you can't tell me whether there were any sales within three weeks of coils and notched angles? A. You mean all together?

Q75. Sent to the same job; was it within four weeks? A. Yes, within three or four weeks there has been a sale made.

Mr. Wittemore: These questions are objected to as they obviously relate to periods of time since the injunction, and the accounting is limited to the period ending with the date of the injunction.

62

Mr. Griffin: If you will admit that you are now selling coils and notched angles for the purpose of being assembled on the job by the contractor we will not require to examine this witness further.

Mr. Wittemore: I have been called into this case only yesterday, on account of the engagements of Mr. Johnston, who is handling this case, and I am not prepared to either admit or deny Mr. Griffin's proposed statement. I can say, however, that the company will be glad to furnish Mr. Griffin with exact information as to what it is now selling, and if he believes that its present product constitutes an infringement of the patent he, of course, has his remedy by contempt proceedings.

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Q76. Is it your custom at the present time to sell coils and notched bars to any contractor

that comes into the office and desires to buy them? A. Why, yes, sir.

Q77. Down to date? A. Yes, sir.

Q78. Could you give me the names of any contractor to whom you have sold coils and notched bars within the last two months? A. The Turner Construction Company—wait just a minute, I am not sure; you said coiled wire and notched angles, you didn't call them spirals, did you?

Q79. Coiled wire or spirals? A. It has been coiled but not made up, that is, it is field as-
65 sembled; it is the coiled wire and the notched angles.

Q80. They have been sold to the Turner Company? A. Turner Construction Company.

Q81. What other company? A. We sell so few of them; you see the line I am most interested in is the bar end of the business.

Q82. Is there any other person in the company more interested in the spirals? A. I don't think so; spirals are a side issue with us; bars are the big end of the business.

Q83. Do you know what is being done in the
66 other offices, with respect to spirals, how many are being sold? A. No.

Q84. Have you been in any other office recently? A. No, sir, not within three years, maybe four years.

Q85. Can you give the name of any other company than the Turner Construction Company to which these spirals and notched angles were sold? A. Oh, if you ask me about bar orders that would be one thing; when you come to spiral orders, those are so few and far between

it makes me think. We got an inquiry the other day, I think the Republic Fireproofing Company, my recollection is we sold them a very small order, just what the punch was I don't know; from recollection it amounted hardly to a ton.

Q86. Any others? A. I would not want to say, there may have been others.

Q87. You think there were? A. I don't say I think there were, I say there may have been others, there possibly were, I don't know.

Q88. Is there any other person in the office in which you are engaged in selling spirals and 68
notched angles? A. Just simply selling spirals?

Q89. No, any other person than yourself selling spirals? A. They don't sell any great quantity, they do sell them; I don't know as they would know anything more about it than I do, it is more a matter of record, it might better be a matter of record than memory.

Q90. Who else has sold some spirals and notched angles besides yourself? A. I don't know that you would say I have sold them myself, the order was sent in to the company and 68
came to my desk, and I saw that it was put there; I don't go out of the office to sell at all.

Q91. Where did you say the plant for making the spirals was located? A. Camden, N. J. and Youngstown, Ohio.

Q92. What street number, where is the location? A. I don't know, I could get there, I have been there once and know how to get there,

70 *R. W. Barbour—For Plaintiff—Direct.*

but just what the street address is I couldn't say.

Q93. Have you any idea of the proportion of set up spirals to knocked down spirals and notched angles sold, I mean spirals connected to notched angles, and spirals unconnected but sold with bars for connection in the field? A. As I said, any so-called spiral that is used in New York City or within a radius of 25 miles of New York has to be shipped field assembled.

Q94. Then most of the spirals sold in New
71 York were for field assembly? A. Yes, it was; it couldn't have been anything else because the contractors would have had their jobs held up.

Q95. I will hand you a bar, or angle I should say, and ask if that is the form of an angle that is produced by your company for the support of spirals? A. At the present time, you mean?

Q96. Yes, at the present time?

Mr. Whittemore: I hardly think this witness is qualified to answer.

The Witness: I am not.

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Q97. Don't you know the character of angle—do you know whether that is the character of angle bar produced by your company? I don't mean to say I want you to identify this bar as being a bar produced by your company, but there is no difference between this angle and the angles produced by your company for the support of spirals, is there? A. You mean produced at the present time?

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Mr. Whittemore: Objected to on the ground that the witness is not qualified to answer.

Objection overruled.

Exception.

A. I know that there are slots made in the angles—you said what we were making at the present time?

Q98. Yes, making at the present time? A. But I don't know, truthfully, what kind of slot we are making now; I know we are slotting the 74
angles; those details don't interest me at all.

Q99. Is this such a slotted angle as your company has made in the past, during the period of this accounting? A. You want a definite answer one way or the other and I don't know whether I could say it was just exactly as we used to slot them; in a general way it might be. I don't see how I am qualified to answer that question, I have nothing to do with the manufacture of that material, I don't know the details, I am a salesman.

Q100. Have you ever seen the bars, you have 75
some in your office? A. We have them in our show rooms, reception room; I don't spend much time out there, though.

Q101. You have seen the goods you sell, have you not? A. Well, I have seen a Havemeyer bar; you ask me about a Havemeyer bar and I will tell you about it from one end to the other.

76 *R. W. Barbour—For Plaintiff—Direct.*

Q102. You said there was no one in the office who knew more about it than you? A. I said in the selling, I didn't say the manufacture.

Q103. Who is more familiar in the New York office with the manufacture, or in any place? Does Mr. Havemeyer know more about it than you do? A. He is the president of the company, I don't know whether he does, he might possibly know more about it, I don't know.

Q104. Can you not give me the name of anyone from whom I can get some information,
77 who knows more about it? A. I suppose the men down in the shops would know more about the way they were slotted, the angles, than possibly anybody else.

Q105. Coming back to this angle again, isn't that angle slotted similar to the way your company has been slotting angles since 1916 down to date?

Mr. Whittemore: Objected to.
Objection overruled.
Exception.

78

A. For instance, the only spiral that I have ever seen—

Q106. I am not asking about the spiral? A. This is an answer to your question—the only spiral I have ever seen excepting about four years ago, when I was in the Camden shop, and I don't remember the details of that spiral at all, is a spiral that I saw once on a job, and I couldn't say whether it was slotted exactly as this angle is or not; it was slotted, and pos-

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sibly—I couldn't say; as a matter of fact I don't think I am qualified to testify. I am willing to say, if I knew positively that we had slotted angles in just that manner, I could swear it was slotted just exactly as that is, you can be sure I would say so.

Q107. I ask if there is any difference between the slotting of this angle and your own—not that it is your own?

Mr. Whittemore: The question is the same oppositely worded.

80

A. You say that the angle we are making at the present is like this, whether or not it is like this, that the question?

Q108. At the present time, or from August 16, 1916, down to date? A. At the present time I don't know, I haven't seen a slotted angle turned out.

Q109. Have you at any time during that period seen slotted angles? A. Yes, I have, and it had a slot.

Q110. Substantially identical with this one, as near as you can tell? A. Well, I should say so, yes; it was slotted similar to this.

81

Q111. You have some slotted angles in your display room in your office at 42 Broadway, have you not? A. We did have some, whether they are still there I don't know. As I said, I don't spend much time in the display room.

Q112. How do those spirals and slotted angles compare with this slotted angle? A. You mean the one that is in that display room?

82 *R. W. Barbour—For Plaintiff—Direct.*

Q113. Yes? A. I don't know that it is there; I have walked by that display room a few times in the last three or four weeks, but I don't think I have stepped into it. It is just a kind of little space off the hall, and I haven't looked at the spiral, so truthfully I don't know whether it is there or not.

Q114. Will you examine the exhibit that is to be supplied here, and which was previously in the record in this case, and identify it so that we may stipulate the next time we are in court that
83 you do identify that particular spiral? A. In a general way it is possibly slotted as this angle is slotted.

Q115. Who in your company is more qualified to explain to us about the operations of the company in spirals and slotted angles? A. You mean the manufacture?

Q116. Any part of it, manufacture or sales: I am particularly concerned with sales? A. In the sales end of it, from the New York office I probably know as much about the spiral sales as anyone.

84 Mr. Griffin: I ask to have this exhibit marked.

It is marked Plaintiff's Exhibit 1 for identification of this date.

Q177. What differences do you note between the angle before you and the slotted angles put out by your employer since August 16, 1916, to date?

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Mr. Whittemore: Objected to unless the dates are definitely fixed.

Objection overruled and exception.

A. As I said before, I don't think I am qualified to answer that, because I don't really know how they are changing the angles at the present time.

Q118. But you do not notice any differences? A. I don't see them.

Q119. You don't see any difference? A. I don't see the angles.

86

Q120. As far as you know there are no differences? A. No, sir, I would not put it that way; I don't think I am qualified to answer.

121. Do you know of any differences, if you do please state them? A. I don't know that there are any differences and I don't know whether there are or not.

Mr. Whittemore: In view of certain discussions between counsel and the Master off the record, I will advise Mr. Griffin of the structure which the Concrete Steel Company is now selling, without however, waiving any rights of objection as to relevancy and materiality, or the propriety of investigating such structure on the account.

87

Direct examination finished.

Adjourned to October 14, 1919, at 10:30 a. m.

88 *Harry T. Bahr—For Plaintiff—Direct.*

New York, October 14, 1919,
at 3:30 p. m.

Before: WILLIAM PARKIN, ESQ., Master.

Met pursuant to adjournment.
Present, Mr. Edwards and Mr. Johnston.

HARRY T. BAHR, being duly sworn and examined as a witness for plaintiff, testifies as follows:

89 By Mr. Edwards:

Q1. You are the Harry T. Bahr who verified the report in an affidavit dated the 22nd day of September 1919, are you not? A. Yes, sir.

Q2. And you prepared the report annexed to that affidavit? A. Together with my assistants.

Q3. It was done under your supervision? A. Yes.

Q4. Just what does this report cover? A. It covers all of the orders on spirals, as submitted to me by our order department.

90 Q5. Just explain a little more fully what that means, spirals attached to the reinforcing, or not attached. A. I don't know anything about the mechanical end at all. I was given a schedule of all the spiral orders that I was to render an accounting on.

Q6. Then you cannot explain whether these orders cover spirals attached to angles or not? A. No.

Q7. They may or may not have been, as far as you know? A. For all I know.

Q8. Who can tell just what these reports cover? A. I don't know.

Q9. Is there anyone at your office who has any idea as to what structures are covered by this report? A. I imagine Mr. McGee, he is the secretary; he is the one under whose direction I got up the schedule.

Q10. And he could take the order number and from it identify the kind of spirals that were sold? A. I believe he could. 92

Q11. Have you any catalogues or other literature which will show just what each order covvers? A. That I don't know.

Q12. Do you know the kinds of spirals sold by your employer? A. A spiral is a spiral to me.

Q13. And you do not know how they are held in place? A. No.

Q14. You recollect getting up the statement showing the profit and loss on spirals? A. Yes, sir.

Q15. You recollect that at an earlier date you got up a cost sheet showing the cost of spirals? 93 A. Yes, sir.

Q16. Will you tell me how the various items in the first report can be identified with the corresponding items in the second? A. The cost sheet is made up on the basis of shipment, and as we did not have the cost on each shipment we had to combine the costs on each order to get the total cost of that order; that is why the cost is blank; that is included in some other item.

94 Q17. The cost is given in the cost sheet supposing you illustrate by taking the first item in the profit and loss sheet and the first item in the cost sheet, and state whether or not those items correspond? A. On this schedule (indicating cost sheet) we have itemized the cost on each shipment; on the profit and loss sheet we have shown only the total cost. On the first item you will see the total cost, $10.21, on the profit and loss, and $10.21 on the cost.

Q18. So these two items correspond? A. Yes.

95 Q19. And the same is true of the second item, is it not? A. Yes.

Q20. How about the third item; as I understand it there is no correspondence? A. Because that on the profit and loss sheet is included in the total cost of an order, whereas on the cost sheet it only represents the partial cost.

Q21. So as to the third item there is some confusion, and one could not understand just how one matches up with the other? A. The way to combine these costs is to have the order number so as to get the cost on here (indicating profit and

96 loss sheet). In order to obtain the cost as shown on the profit and loss sheet, in some instances you have to make a combination of cost on the cost sheet, because they only represent the cost of shipments, which may be partial and not complete. Take the third item on the profit and loss sheet, we have two dates there, the 22nd and the 16th; that means there were two shipments made, and the same way with the next item, shipments made on the 16th, 23rd, 29th and September 14th,

so that the cost on the profit and loss sheet would be the total cost of the order.

Q22. Turn to the next sheet and explain it as to the third item? A. This represents the cost of the shipment.

Q23. Each day? A. Whenever the shipment was made.

Q24. And it is not collected according to order number? A. Yes, that is right, whereas on the profit and loss sheet the cost is collected according to order number, although there may have been half a dozen shipments, you see, on each 98 order.

Q25. Can you give us a statement which will show the cost of each order according to the profit and loss sheet? A. It is already shown on this statement, the profit and loss sheet, that is what I have already given.

Q26. You have given the total but not the itemized cost which appears on the cost sheet. The trouble is that as to a great number of items it is impossible for me to identify the cost sheet with the profit and loss sheet. A. I can do that, yes.

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Q27. I wish you would substitute that for the cost sheet, to be used in lieu of that, or in addition to it, then we can make something out of it. A. In other words, you want an itemized profit and loss sheet?

Q28. By order number, that matches up with this, yes? A. Yes.

Q29. I note that as to several items there is a cost charge on the profit and loss sheet, but no selling price, as for example, order CN 5005, under date of December 5, 1916; will you please

100 *Harry T. Bahr—For Plaintiff—Direct.*

explain that? A. I will tell you, that may represent a shortage which we could not bill out.

Q30. Have you any other explanation to give? A. No.

Q31. I ask you to look over the sheet and note that such discrepancies occur several times; is this the only explanation you have? A. At the present time, without looking it up.

Q32. Then these spirals were never given away? A. No.

Q33. I call your attention to the item attached
101 to your affidavit under date of July 29, 1919; how did you determine that item, interest on the capital invested? A. I took the period for which the accounting was to be made and totaled up the capital stock and surplus of the company by months for that period, struck an average, and then ascertained the ratio of spiral sales to the total sales of the company and took that proportion of the average capital.

Q34. What was that proportion? A. I don't recollect; you would have to figure that back on the basis of the interest which is at 6%.

102 Q35. Will you kindly give us the exact figures so we can check that up? A. I will give you that at some other time.

Q36. When you furnish the other report at a later date? A. Surely.

Q37. Can you determine as to which orders the spirals were shipped attached to the spacing angles, and as to which orders the spirals were shipped separately from the spacing angles? A. No, sir.

Q38. Is there no way of determining that from the records of your company? A. That I don't know.

Q39. Will you find out and report as far as you can? A. Yes.

Q40. If you can give me the information please let me know what was sent each way, that is in bulk? A. Yes.

Q41. You understand that when I ask you to do anything it is satisfactory if any competent officer of your company does it, we ask for no duplication; if any request overlaps any request 104
of Mr. Barbour the plaintiff will be entirely satisfied with one compliance? A. Yes.

Mr. Edwards: I request that Mr. Barbour produce the information requested at page 14 of the record, and I will state that this witness need not bother with the same as long as Mr. Barbour does it; that does not apply to the cost sheet by order number.

Q42. Returning now to the cost sheet, I notice 105
that you have under the first item the material cost; what does that mean? A. It represents the cost of material.

Q43. That is the iron that goes into the order? A. The basic cost.

Q44. Then what does the item labor include? A. The direct labor.

Q45. That is, the man who punches out the bars. A. Direct labor represents the labor that can be directly allocated to the product.

106 *Harry T. Bahr—For Plaintiff—Direct.*

Q46. And that in this instance would be the slotting of the bar? A. Whatever it may be.

Q47. And the joining of the bar to the spirals, where the bar is joined to the spirals? A. I should say so.

Q48. What is manufacturing overhead? A. That represents the indirect expenses applicable to that proportion of direct labor.

Q49. How do you separate that item from general overhead? A. We keep our factory overhead separate from general overhead; we don't
107 merge all the overhead; we have a separate factory and it is easy to collect all the indirect expenses of that factory.

Q50. And that is what is included in manufacturing overhead? A. Yes, sir.

Q51. Nothing but what belongs to the manufacturing expense? A. That is right.

Q52. If you have bookkeeping, etc., for nothing but factory, that goes in to the factory overhead? A. Yes.

Q53. What does the selling expense include? A. Cost of selling the spirals, and that is arrived
108 at by taking the ratio of the selling price of spirals to the total selling price of all products, and taking that percentage of the selling expense.

By the Master:

Q54. In that connection how is the manufacturing overhead arrived at, is that on the proportion? A. On the basis of direct labor.

Q55. Direct labor as compared with the total direct labor? A. Yes, sir. I would like to cor-

109 rect that, the selling expense applicable to spirals was obtained by taking the tonnage of spirals as compared with the total tonnage of all products, and taking that percentage of the total selling expense.

By Mr. Edwards:

Q56. Would the value of each ton of your various products be about the same? A. No, spirals would be higher, so it is to your advantage.

Q57. That is, bars cost less than angles? A. 110 I do not know.

Q58. Then you do not know the tonnage value of bars as compared with the tonnage value of angles? A. No.

Q59. You just assumed, however, in estimating this selling expense that a ton cost the same whether it was made up into angles or spirals or bars, is that right? A. I didn't assume anything; I took the total selling value of the spirals, which is shown on the bills that we render to our customers, and that in every case is higher than a ton of bars; what you are doing is split- 111 ting up the spirals, you are taking the spacers as a separate item. To me a spiral is a spiral, whether it has a spacer attached to it or not; the selling price of a spiral without a spacer is greater than the selling price of bars per ton.

Q60. What is included under the item general overhead? A. That represents the general overhead, everything outside of the selling expense and the manufacturing overhead, the labor and material cost.

112 *Harry T. Bahr—For Plaintiff—Direct.*

Q61. That would include officers' expenses and other miscellaneous general expenses? A. Yes, sir.

Q62. On what basis were they applied to each order? A. On the same basis as selling expenses.

Q63. That is by tonnage? A. By tonnage.

Q64. Can you state the proportion of the spiral tonnage to the whole tonnage of the company? A. I can give that later; I haven't that with me.

Q65. Will you please do so? A. Yes, sir.

113 Q66. I show you statement which is taken at random from the profit and loss sheets submitted by you, which is reduced to the per ton basis, and it shows that the cost of steel per ton varied from $840 per ton down to $56.50 per ton; I ask you how you account for these discrepancies? A. I don't know how you account for it; I don't know that statement; I don't know what you have done; on the face of it it is ridiculous.

Q67. It is taken from your report and reduced to the per ton basis; you have given the

114 weight, I believe, as to various items, and the cost of manufacture, and the selling cost? A. You specified material cost, didn't you?

Q68. That is total cost; I have made a mistake, I should have said total cost and not material cost. Can you explain why such a great variation in cost? A. No.

Q69. There should not be any such great variation in cost, should there? A. Well, the cost all depends on the size of the order.

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Q70. Would any orders run up to anything like $840 a ton cost? A. I could not answer that question without finding out for myself.

Q71. Supposing I give you the paper and ask you to check it up and report whether or not it is correct, at a later date, and if it is correct explain why? A. Yes, sir.

Q72. Will you just state what your duties are with the Concrete Steel Company? A. I am the auditor of the Concrete Steel Company; I have charge of their accounts, and I am also assistant secretary.

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Q73. And it is your business to keep track of costs, profits and losses, and so on? A. Yes, sir.

Q74. Just from the figures? A. From the figures.

Q75. You do not come in contact with the actual structure sold? A. No, sir, we have plants all over the country, and the reports are made up on these plants and submitted to me.

Q76. And the profit and loss sheet covers the entire country? A. Yes, sir.

Q77. Do you know how many sizes of spiral reinforcers you make? A. Yes, sir.

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Q78. Do you know whether or not the cost of producing spirals is the same regardless of the diameter of the spiral? A. No, sir.

Q79. Do you know whether or not a ton of spiral costs the same, no matter what the cross section of the wire is, it is only a matter of setting the rollers? A. It is only a matter of diameter of the spiral; surely in a larger spiral there would be more material.

118 *Harry T. Bahr—For Plaintiff—Direct.*

Q80. Per ton it would be the same? A. It all depends on the size of the wire, I should say; isn't there a variation in the price.

Q81. I do not know, is there? A. I am pretty sure there is.

Q82. Any great variation? A. No.

Q83. We can disregard it for the purpose of this accounting, as far as you know? A. Yes, sir.

Q84. Can you have the figures in two weeks? A. I will try my best.

119 Q85. None of the papers submitted by you give the names and addresses of the persons who place the orders? A. No.

Mr. Edwards: I object to the statements for this reason, and ask that the names and addresses of the persons placing the orders be furnished, as required by the Master.

Mr. Johnston: This we decline to do unless ordered by the court. The question has been raised in a large number of cases; only recently, that is within a year

120 past, it was raised before his Honor Judge Hazel in a very important accounting in which the defendants admitted liability for $225,000, and Judge Hazel refused, as did the Master, to order the opening of books to an investigation of that character, and specifically refused to permit us to be forced to disclose our customers' names and addresses. The case was the Safety Car Heating & Lighting Company v. U. S.

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Light & Heat Company, a case arising in the Western District of New York under substantially similar circumstances to this, that is, the Court of Appeals had acted in the matter and sent it back for an accounting.

Mr. Edwards: It seems that some profits have been made out of these infringements complained of by the defendants, and it is altogether likely that other profits have been made by the builders or contractors who used the infringing devices; I cannot tell at this time from the information given as to where the plaintiff must look to recover the profits, and as the defendant is a co-conspirator with the contractor who used the infringing devices in the buildings. I think that the defendant should give the necessary information.

122

The Master: If this is the object I shall deny the motion. You cannot use this suit for getting evidence in another suit.

Mr. Edwards: I give notice on the record that the plaintiff will take testimony in this case in Pittsburgh before a notary public, to be announced later, of Horace R. Thayer and John M. Chester. This testimony will be taken at the office of the Clerk of the United States District at Pittsburgh, Monday, October 20, at 10 a. m.

123

124 *Bruce Clark White—For Plaintiff—Direct.*

Mr. Johnston: I am in daily attendance on the Court of Appeals, I do not believe I can be in Pittsburgh on the 20th as I think my case will be reached on that date.

Adjourned to November 5, 1919, at 10.30 a. m.

New York, October 23, 1919.

125

Met pursuant to adjournment.
Present as before.

BRUCE CLARK WHITE, being duly sworn and examined as a witness for plaintiff, testifies as follows:

Q. What is your address, Mr. White? A. 31 West 12th Street, New York City.

Q. Your age? A. 60.

126 Q. What is your occupation? A. Mechanical engineer.

Q. How long have you been so engaged? A. 40 years.

Q. Have you had any experience with re-enforced concrete? A. I have.

Q. With what company? A. Principally with the Monolith Company whose principal offices were in Washington, D. C.

127 Q. And where was the work with them done? A. Those works were at Colonna, Pennsylvania, about 25 miles west of Pittsburgh.

Q. Have you examined the records in the case of Vandenburgh against Concrete Steel Company and in Vandenburgh against Electric Welding Company? A. To some extent, yes.

Q. Have you also examined the Building Code of New York with respect to the requirements for re-enforcing concrete columns? A. I have.

Q. And what would you say with respect—

128 can you give the requirements as to the securing of spirals to the longitudinal re-enforcing recited in that law? A. The law provides that the hoops or spirals shall be rigidly secured to at least four verticals to insure uniform spacing (new).

Q. What practical means were known in this country for securing spirals to the spacers for concrete re-inforcing, beginning with August 16, 1916, down to July 1, 1919, open to the public, to your knowledge? A. I know of none except the old method of wiring spirals to the vertical bars.

129 Q. Do you know of other methods of securing the spirals to the vertical bars? A. There are other patented methods consisting in some form of special clip or in the case of the Monolith system, staples pinched into grooves in the vertical bars and closed over the spirals.

Q. What have you to say with respect to the value of the Vandenburgh method of securing the spirals to the bars as against any other

130 *Bruce Clark White—For Plaintiff—Direct.*

methods that you know of? A. I consider such a method of great utility and great value.

Q. Are you familiar with the Cummings patent, 822,587, which shows separate rings secured to the longitudinals by means of spurs on the longitudinals? A. In a general way, yes.

Q. What have you to say with respect to the value of the substitution of spirals for the separate rings shown in that patent, as shown in the Vandenburgh patent? A. The spiral as compared with the separate ring is of course very
131 much more practical in that the separate ring system of hooping columns is not a practical method at all as it is expensive, difficult of manufacture and assembly, and is very much weaker than the spiral hoop system.

Q. With respect to all the present known methods of re-enforcing concrete columns, do you consider the Vandenburgh method of securing the spiral the best or the worst, or what is your judgment with respect to its position in the art? A. The Vandenburgh method in which the spur of the vertical column member itself is closed over the spiral hoop by the blow of a
132 hammer is in my opinion the most valuable and practical method of rigidly attaching the hoops to the vertical bars that can be conceived.

Q. And do you know whether or not that complies with the building requirements as to the rigid fastening called for? A. That complies exactly with the requirements of the ordinances of the City of New York, for instance, which also largely obtain in all the other large cities of the United States.

Mr. Johnston: The answer is objected to as stating a conclusion of law, and therefore incompetent.

Objection overruled.

Q. Have you personally made use of the re-enforcing shown on page 392 of the Electric Welding Company record, heretofore referred to in this case? A. Page 392 illustrates a form of re-enforcing, or of column re-enforcing comprising both hoops and spirals stapled and attached to Monolith bars. Only the spiral form 134 has been used, the other part of the illustration being only to show the general adaptability of the Monolith stapling, but not to my knowledge ever used.

Q. Have you ever made use of the wired on staples personally? A. If you refer to the old-time method of securing the wires to the columns —I mean the spirals to the columns by twisting wire about the tip, I have never used it personally nor seen it used in any practical way.

Q. Do you consider that the wiring on could ever be as good as the Vandenburgh method? 135

Mr. Johnston: That is objected to as leading.

Objection overruled.

A. It could never be as good.

Q. State why? A. For the reason that it does not give an absolutely rigid attachment of the spiral to the bar or prevent the endwise slipping of the spiral upon the vertical bar. It is

also difficult to accurately space the spirals to get the very best effect and is a slow and expensive method of assembling either in the shop or field.

Q. Have you as a mechanical engineer gotten any estimates on the cost of wiring on the spirals and of securing the spirals by the Vandenburgh method, that is comparative costs? A. In a general way, yes.

Q. What do you estimate the cost of wiring on the spirals to be for a column we will say
137 having spirals 2 feet in diameter and containing roughly half a ton of material and made up of half inch wire rod? A. That will naturally vary some in locality and efficiency of shop management or field supervision, but my conclusion is that it might amount to $15 a ton.

Q. And what would you estimate the cost of securing a similar spiral by the Vandenburgh means? A. That would be a mere fraction of the above figure, perhaps amounting to $1 a ton or not to exceed that.

Q. Could you not give a more careful esti-
138 mate of the cost of wiring on, that is do you think it would be $15 a ton, or more or less, that is making a more exact estimate? A. I could hardly fix the figures any closer except I had an exact layout of column bars; pitch of spiral, size of members, etc., in fact every particular that would affect the cost.

Q. Assuming a column 20 feet high with ½ inch spiraling, spaced 3 inches apart and the spiral 2 feet in diameter and having the spiral

secured as required by the Building Law, what would you say the cost would be if hand-wired and if secured according to the Vandenburgh method, eliminating the cost of the steel and delivery? A. Is this to be field or shop assembly?

Q. Field assembly. A. I assume that the method in the case of the hand-wired column would be that the bars and spirals are shipped to the building and are wired on according to the building laws, securing every coil to each of 4 vertical bars to which they are to be attached, and that the method employed consists in wind- 140
ing a coil of soft wire about both bars and spirals to secure the spirals in vertical position, and also to secure the bars in lateral position in relation thereto, the security being sufficiently rigid to prevent the misplacement of either vertical or spiral members when the concrete is poured. Such a column re-enforcement as inquired about would require 4 coils per foot of length or 80 coils or turns for the column, and if security is made to each of 4 bars for each coil, there will be a total of 320 wirings called for per column. Two men will be required at least 141
and from such experience as I have had in work of this kind, I should say that it would entail a cost of $10 per column. Now as the assembled part of such a column would be about 500 pounds, my estimate would be that the cost per ton would be approximately $40 for the assembled part alone. Such a column would have perhaps a total weight of a ton, therefore the cost per ton of assembled column re-enforcing would be

142 *Bruce Clark White—For Plaintiff—Direct.*

about $10. In the case of a column re-enforcement according to the Vandenburgh system, the spiral would be bent cold to suit the specification and the bars to which the spiral is to be attached would be received from the mill notched or kerfed, and a shop assembly would combine the spirals and 2 of such bars in a collapsible form to expedite hauling and shipping and at the building this structure or partial structure would be straightened up and the other two bars required by the building laws would be dropped
143 into place, in a few minutes time the operators could hammer down the spurs of the kerfs on to the remaining joints or spirals, thus completing the column re-enforcement. Such an operation might consume the time of a couple of men for half an hour or a total of perhaps an hour for a column of such dimensions as inquired about. This would be about 10 per cent of the cost of a wired column such as first described, in which resort is had to a wire wound about the different members. The column inquired about is longer than the average re-enforced column, which is about 14 feet ordinarily. It is probably
144 larger and heavier than the average of such columns, so that in estimating the costs of average columns, the time consumed would not vary much from the above, but the weight would be considerably less and would add to the cost per ton, by which I mean to say that the cost per ton of such a column as inquired about is probably the minimum for such work. Your question assumed field assembly entirely. Should this be

145 the case, there would probably be some extra cost above that of my estimate, as field assembly never can be done as economically as shop assembly. There might, however, be some freight and handling charges which would offset the above, and the difference would not be great in any case. I will therefore let my estimate stand for a complete field assembly.

Mr. Johnston: The answer is objected to because it is irrelevant. The defendant in this case is a manufacturer of iron 146 work, is not engaged in building re-enforced concrete construction. The savings which are made in that construction therefore do not relate to defendant's profits and have no bearing upon the account which it has filed.

Overrule the objection for the present.

Q. How do you arrive at the cost of the wired on joints of the spirals and longitudinals? A. By estimating in my mind the probable time that would be consumed in such work, based 147 principally upon my experience in having various kinds of such work done. Of course all such estimates are subject to check in actual performance.

Q. Have you estimated the labor cost and wire cost separately, that is the quantity of wire required? A. I made such a figure as would cover the extra cost of the wire necessary to cover the wiring, which is a relatively small matter as compared with the labor cost.

148 *Bruce Clark White—For Plaintiff—Direct.*

By Mr. Edwards:

Q. You compared the cost of partial shop assembly as to the patented structure with the wiring on the job as the old prior art method, will you please state what would be the cost of using the patented method on the job? A. My estimate of the assembly under the patent was partially shop and partially field assembly, but as I have already stated the difference would not be important if it were all field assembly,
149 especially in view of reduced cartage and wiring in the latter case. In the case of the wire I assume it to be wholly a field assembly. Of course, costs vary with the extent of the work and the amount of organization permissible and also upon the employment of handy apparatus to expedite such assembly, which might not be warranted in a small contract, but would be important in a very large one. To get at anything relatively close in these calculations, one must have an exact lay-out of the whole contract to be executed.

150 By Mr. Griffin:

Q. Considering a sufficient number of bars only to comply with the building requirements, such bars for example, to be four of those that I now show you, plaintiff's exhibit No. 3, defendant's device, heretofore filed in this case, what would you say a fair royalty per ton for the spiraling and four such bars would be, con-

151 sidering your previous statement for an average sized column? A. In view of the conclusions expressed in my previous replies, and the assumption that the conditions set forth in the questions would obtain ordinarily my opinion is that a royalty of $12 per ton would be fair and equitable.

Mr. Griffin asks and insists that the case be heard upon cross-examination at the earliest possible date and that a definite date be set for such hearing.

152 Mr. Johnston: As Mr. Griffin is not in town and the matter must be left with Mr. Edwards in any event, I cannot see that his wishes should influence the Master further than that of course the Master desires to expedite the case. Some consideration must be given my appointments. I have been pressed I think a little unreasonably in view of my engagements in the Court of Appeals at the present time and I have come at times when I should have been doing other work. This is only one of a number of cases in

153 my charge and I cannot be required to turn them over to other parties to be conducted.

Adjourned to Friday, October 31, 1919, 10 a. m.

154 *Bruce Clark White—For Plaintiff—Direct.*

New York, October 31, 1919.

Met pursuant to adjournment.
Present as before.

Mr. Edwards: I wish to bring out a little more fully the qualifications of Mr. White.

The Master: I will let you ask the questions.

Mr. Johnston: I object to the action of the master in permitting the reopening of the deposition, a week after it has been closed, for the
155 purpose of patching it up in a respect in which counsel believes it to be defective.

Mr. Edwards: I note on the record that the direct examination of this witness has not been closed.

BRUCE CLARK WHITE resumes the stand:

By Mr. Edwards:

156 Q. Please state what experience you have had with re-enforced concrete? A. I was chief engineer and superintendent for two years or more, off and on, for the Monolith Steel Company of Washington, D. C., and designed apparatus for their various concrete steel re-enforcement systems, I designed the section of the Monolith bar, made estimates of the cost of various steel work

for concrete re-enforcement; engaged the help, looked after the accounts, correspondence, contracts, shipments, etc. I am familiar with building constructions of various sorts, having served an apprenticeship to a firm of architects in Chicago, finally becoming foreman of the office.

Mr. Edwards: Direct examination closed.

Cross Examination by Mr. Johnston:

Q. Who makes the added profit from Vanden- 158
burgh construction, assuming that there is one, according to the figures which you have given, say on page 48; I mean by my question does the manufacturer of the ironwork make the profit or does the contractor who erects the building make the profit? A. I don't know.

Mr. Johnston: Master, so far as the present witness is concerned, it is obvious that his deposition, no matter what his qualifications may be, is incompetent for want of knowledge. If he cannot tell who 159
made the alleged saving in cost, his deposition would have no bearing on proper royalty for the manufacture of the ironwork paid.

The Master: It may be only one step in the proof, Mr. Johnston; that may be supplemented.

Mr. Johnston: Very well, sir, I will simply reserve my objection to the depo-

sition as wholly incompetent, and irrelevant, in view of the witness's last answer, leaving the Master to pass on it when he makes his report.

Q. What is the average profit which a manufacturer of ironwork makes on a ton of concrete re-enforcing? A. I found that this varied enormously in the size of the contract, the unit size of the bars and the price of steel and the price obtained for the concrete re-enforcement. It was
161 sometimes very small, to the point of disappearing on some small contracts, and on large contracts it was a relatively large profit amounting in some cases to half the contract price.

Q. Mr. White, is it not possible for you to give some figures for the Master's guidance, for example, you say that on small contracts the profit may disappear, and I understand it to be a fact that on very small lots the ironwork may be supplied at a loss for business reasons, but your upper limit is not given in figures at all. About what in dollars per ton would be a fair average
162 profit, and about what in dollars per ton would be a substantial maximum profit on a contract of reasonably large size? A. At the time that I was engaged in the production of concrete re-enforcement, I recall some contracts in which we obtained about $60 per ton gross for the steel and in such a case there were profits at times of a half of this price, or $30 per ton, exclusive of the engineering cost. I refer now to what were known as shop profits.

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Q. What was the date of the work to which you referred in your last answer, of course I mean approximately? A. This work was executed in 1908 or 1909 as I recall it.

Q. Your shops did not make the steel but fabricated it, if I understand the situation, is that right? A. That is right.

Q. Do you remember the price which you paid for the steel, of course approximately? A. The base price on bars as I recall it ranged from $24 to perhaps $28 per ton during that time. I recall that it fluctuated considerably. By the base 164
price I mean a price for a certain section of bar based upon a certain percentage of carbon. Other sizes of bars and other percentages of carbon would change the price.

Q. 1908 and 1909 was about the time when re-enforced concrete work began to be extensively used, was it not? A. Yes, although it had been extensively used previous to this time, its use was growing while I was in the business.

Q. Are you familiar with the base price of steel at the present time, say for the past 2 years? A. In a general way, yes.

Q. Please state for the Master's information, 165
about what the fluctuations have been and we will say since the middle of 1916? A. In 1915—may I go back to that—

Q. Yes. A. The published price of steel rods for instance, such as would be used for spiraling a re-enforced column, was about $30 base. In 1916 the price advanced to $55 and by October of that year to $60 and in the following year it was

166 *Bruce Clark White—For Plaintiff—Re-direct.*

quoted as high as $85 per ton. It dropped back during the last year or 18 months to $57, I do not know the present quotation.

Q. What is the average percentage of profit on the turnover in a factory which buys its iron or steel and turns it into a fabricated product—can you answer that question? A. I would not say what it is. It would doubtless vary a great deal in different shops under what might appear to be similar conditions.

Q. What royalties have you paid for re-en-
167 forced concrete steel, Mr. White, in the work which you have yourself done? A. If you mean by royalties, amounts paid to the holder of a patent, we never paid such royalties, as the Monolith Steel Company owned the patents under which it operated.

Q. Have you personal knowledge of the payment of any royalties, as royalties, that is payments to the owner of a patent right for the use of any steel re-enforcing for concrete? A. I have no such personal knowledge.

168 *Re-direct Examination by Mr. Edwards:*

Q. You have been asked as to whether the fabricator of the metal going into re-enforced concrete or the contractor makes the profit where the Vandenburgh invention is used, and I believe your answer was that you did not know. Assuming this to be the case, does it make any difference as to what would be a fair royalty to the inventor as to who makes the profit?

169 Mr. Johnston: Objected to as incompetent, the witness has stated that he did not know. No proper answer can be based on lack of knowledge. The question is also objected to as requiring the witness's opinion upon a question of law; one of the things which the Master will have to determine is whether that makes any difference.

Objection sustained.

170 Q. When you stated what in your opinion would be a reasonable royalty to the inventor for the use of his invention, did you take into consideration whether the royalty should be paid by the fabricator of the re-enforcement or by the contractor who used the same? A. I did not.

Mr. Edwards: Re-direct examination closed.

Mr. Johnston: Signature waived.

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IN THE
DISTRICT COURT OF THE UNITED STATES,

FOR THE SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,

vs.

CONCRETE STEEL COMPANY,
173 Defendant.

TESTIMONY

of

HORACE R. THAYER, a witness produced on behalf of plaintiff, before J. Wood Clark, Esq., Clerk of the District Court of the United States for the Western District of Pennsylvania, pursuant to notice served on Defendant's solicitors, at the office of said J. Wood Clark, Esq., on Monday, October 20, 1919, at 1:30 o'clock P. M.
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APPEARANCES:

For Plaintiff: EDWARD A. LAWRENCE, Esq.

For Defendant: THOMAS J. JOHNSTON, Esq.

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HORACE R. THAYER, having been duly sworn, deposes and says as follows, in answer to questions by Mr. Lawrence:

DIRECT EXAMINATION.

Q1. State your name, age, residence and occupation. A. Horace R. Thayer; forty-six years of age; my residence is Pittsburgh, Pa.; my occupation is civil engineer.

Q2. What specialty, if any, do you follow in civil engineering? A. Structural engineering.

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Q3. You are, I believe, assistant professor of designs at the Carnegie Institute of Technology? A. I was at that time. I am now associate.

Q4. When were you? A. I was at the time I testified there, but I am now associate professor of structural designing. My title has been promoted since then.

Q5. What experience have you had with re-enforced concrete? A. I have been in contact with it since about 1907, more or less. A little before that concrete had been coming into use to some extent, and I had discussed the matter, but my first real experience in design work was

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in working up some re-enforced concrete arches in about 1907 or 1908. I have done quite a little bit of work in re-enforced concrete since that date. I taught it, and practiced it on the outside.

Q6. Were you at one time a member of the faculty of Lehigh University? A. From 1903 to 1906.

178 *Horace R. Thayer—For Plaintiff—Direct.*

Q7. You are the same Horace R. Thayer who testified as an expert in behalf of the plaintiff, in the case of George E. Vandenburgh vs. Electric Welding Company? A. Yes, sir.

Q8. In the District Court of Western Pennsylvania? A. Yes, sir.

Q9. Are you familiar with Vandenburgh Re-Issue Patent No. 14,182, the patent in suit in this case? A. I have examined it very carefully.

Q10. And it was on this patent that you gave expert testimony in the suit in the Western Dis-
179 trict of Pennsylvania? A. Yes, sir.

Q11. What is the nature of the means by which the wire spirals are shown in said patent, as connected to the longitudinal bars? A A small hole, a recess, is punched in the edge of the bar and the latter in inserted through the slot, and it is then pounded tight against it.

Q12. You refer to what is termed in this patent as the spurs 9? A. Yes, sir.

Q13. What other method of attaching spiral wires to longitudinal bars in this character of concrete re-enforcement are you familiar with? A. Well, there are three general types. There
180 is the Cummings method of riveting, and the old-fashioned method of wiring, both of which are practically out of date, and there is one method in common use at the present time which is substantially the same as we have been just discussing; that is, the fastening of the spirals in recesses in the main bar.

Q14. By bending a spur over the spiral? A. By bending a spur over the spiral.

Q15. What advantage is there in the use of this intergral spur, bent over the spiral to hold it in place, over the method of riveting or the method of wiring? A. The method of wiring uses up a good deal of the section of the bar. It was wasted in that way, and riveting is also expensive. The advantage over the wiring method is two-fold. The Vandenburgh method can be collapsed for shipment, and then when it is set up the bars are rigidly held in their proper position. This is very important, because a small displacement of the spirals from their correct position would mean a serious weakening of the concrete column, and this is quite likely to occur when they ram down the concrete.

Q16. In other words, do you mean that the spirals by the Vandenburgh method are always kept in their proper spaced relation? A. Yes, sir. They cannot alter their relative position without the application of a very large force.

Q17. This is not true of the wired method? A. No, sir; unless it is done on the field, right in the field, it is quite likely to be displaced.

Q18. Is it quite likely to be displaced even when done on the field, when the concrete is afterwards rammed around it? A. Well, I wouldn't think that it ought to be if it were fixed up as I have figured it later on, that is, this price of thirteen dollars per ton that I figured it, I would

think that would be a reasonably sound engineering construction.

Q19. Where would the attachment of the spirals to the longitudinal bars be affected in the Vandenburgh method? I mean at the factory or in the field? A. They are attached in the factory. They are shipped in a certain form, altered slightly and set up in the field, but the field operations are comparatively simple.

Q20. Is it not true that the Vandenburg reinforcement is rammed by clinching the spirals
185 to the bars at the factory, and the reinforcement is then preferably collapsed and shipped in the collapsed position, and then need only be extended when put in place in the field A. I believe that statement is practically correct. As I remember, the fastening is not clinched in the shop. The bars are left on loose, but it is clinched when it is set up. In order that it may be collapsed, the bars are shifted around to the two opposite sides and then collapsed. Then when it is set up the bars are brought around in the relative position and then clinched tight.

Q21. Is it customary to wire every joint in
186 the wiring method of assembling this character of structure? A. That would depend upon the size that you used. With the heavier bars I would think it might be omitted. With the lighter bars it would be quite necessary. It would depend a good deal on the care that was exercised and on the size of the bars employed. To my mind, for the smaller sized bars every

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joint should be wired to effect the greatest security.

Q22. Do you think that it is practically possible to make the wired structure as efficient as the structure shown in the patent? A. About as good, yes. That is, if you wire every joint I think it would be about as good.

Q23. Do you think a wired joint of two unnotched structures is as good as a joint which is made by bending a spur around the other element to hold it in the recess?

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Mr. Johnson: This is objected to as outside the scope of the Master's inquiry. The question is not what one thing is worth or whether one thing is as good as another. The issue is the actual profit made by the defendant, and the question does not tend to elicit that.

(Question read).

A. I would say that it is not really quite as good, but the wired structure wired at every joint would be good enough.

Q24. Can you give any estimate of the cost of securing the coils in the recesses of the longitudinal bars, according to the Vandenburgh method, as compared with the probable cost of wiring the coils to the longitudinal bars as in the old practice?

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Mr. Johnston: The question is objected to, first, because an estimate is called for.

190 *Horace R. Thayer—For Plaintiff—Direct.*

The Master's inquiry concerns facts; second, because there are no conditions given, so that the question is too indefinite to furnish a basis for judicial action. Further, whether the work is done in the factory or in the field would have an important bearing upon the witness's answer.

(Question read).

A. I estimate that the cost of punching the bars
191 and fastening them up, the former to be done in the shop and the latter to be done in the field at about three dollars a ton; but this figure would vary a great deal with the size of the bars and their spacing, with the location in which the work was done, with the time in which it was done, whether done now or three year ago. I estimate the cost of wiring up of joints at about thirteen dollars per ton. That again would vary, as the other figure has, with a number of circumstances, but I have tried to give you an average figure for the present time.

192 Mr. Johnson: The answer is objected to as too indefinite to form a basis for any action by the Master.

Mr. Lawrence:

Q25. You think, then, that the comparative cost of the Vandenburgh method of attachment, as compared to the wiring method attachment,

would be substantially as three to thirteen? A. Yes, sir.

Q26. Giving a saving by using the Vandenburgh method, of about eight dollars per ton? A. Well, it would be a saving of ten dollars per ton, plus the saving in freight.

Q27. What, then, would you consider a fair royalty for the use of the Vandenburgh process?

Mr. Johnston: That is objected to as guess-work, and as having no basis upon 194
which to estimate. The Master is required to find what is an existing royalty, and not what would be "a fair royalty."

(Question read)

A. Well, I would think about eight dollars a ton.

Mr. Lawrence:

Q28. Are you familiar with the method of attaching the spirals or hoops, to the longi- 195
tudinal bars by means of a staple clinched to the longitudinal bar?

Mr. Johnston: Objected to as irrelevant.

A. You refer to the spacing bar, do you not?

196 *Horace R. Thayer—For Plaintiff—Direct*

Mr. Lawrence:

Q29. The original bar? A. Yes, sir.

Q30. Can you give an estimate of the comparative cost of this method of attachment, as compared with the Vandenburgh?

Mr. Johnston: The same objection is made.

197 A. It is a little hard for me off-hand to give an estimate of that. I would not think there would be a great deal of difference between the Vandenburgh method and the spacing bar method.

Mr. Lawrence:

Q31. How are the integral spurs of the Vandenburgh method formed—by hand or by machinery? A. They would be formed by machinery.

Q32. Does that contribute to the economy of
198 the method? A. Yes. It would be impossible commercially to get them out by hand; that is, a commercial figure.

Q33. How is the wiring done—by hand or by machinery? A. By hand.

Q34. The wiring of the spirals to the uprights or longitudinals must, I believe, be done in the field? A. If it were done in the shop there would be a great deal of danger of its working loose during transportation and influences to which it was subjected. It wouldn't

be collapsed, and I wouldn't imagine it would stand the ramming that the concrete gets. It must be done in the field, therefore, by hand.

Q35. Then, as I understand you, the use of the integral spur attachment enables the reenforcement to be shipped collapsed, while when wired in the factory, if that were attempted, the reenforcement could not be shipped in a collapsed condition, or if forcibly collapsed, the wiring would not be satisfactory when it was set up? A. Yes, sir. You see, in order to collapse the columns they take the bars and 200 slide them around on the two ends. Now that very act of sliding would loosen the wiring and it would not do the main thing for which it is intended; that is, it would slip.

Q36. While in the case of the Vandenburg attachment, all that would be necessary would be to tap the spur with a hammer, to hold the coil rigidly in place? A. Yes. It isn't necessary even that it be held rigidly in place. You see, all that is necessary is to tap it up so they can't slip out in some way, cannot move up and down. Of course, it is slightly stronger if it is made rigid. 201

Cross Examination:

XQ37. How much practical experience have you had in the actual installation of the concrete reenforcing steel concerning which we have talked? A. I put up a building here in Pittsburgh which was made of reenforced concrete and I have been on the building inspection here

and have inspected buildings that were made of concrete.

XQ38. Is it your opinion that the method of attaching the spiral to the spacer by wire, is different altogether from the Vandenburgh structure? A. As I have said already, if the fastening is done in the field and it is done at every joint, I think it is good enough; perhaps not quite as good as the Vandenburgh idea, but still good enough.

XQ39. That was not the scope of my question.
203 What I meant to inquire was whether the wiring method of attachment is not an altogether different idea from that of Vandenburgh, and outside of the scope of his patent, so far as that is a proper question to ask a witness? A. Yes, it seems to me that wiring to the uprights is outside the scope of his patent.

XQ40. In the record of the Electric Welding Company on this patent, to which reference has been made, I find a patent to Norwood, No. 571,575. Is there any substantial difference between the spur of the Vandenburgh patent and the spur shown in this patent to Norwood?
204

Mr. Lawrence: This question is objected to as an apparent attempt to use the witness as an expert in the interpretation of the patented art, for which purpose he was not produced. It is also objected to as improper cross-examination, as having no relation to any portion of the direct-examination. It is also objected to as

relating to the limitation or scope of the patent in suit, which is not an issue in the present proceedings for accounting.

Mr. Johnston: I will show that it is relevant and material.

Mr. Lawrence: The question is objected to until counsel makes such a showing.

(Question read)

Mr. Lawrence: The witness is instructed that he need not answer that question.

Mr. Johnston: In view of the instruction, I decline to cross-examine further, 206 and I give notice that I shall move in the District Court of the United States to strike out the deposition as taken. I am quite prepared to demonstrate to a Judge the importance, relevance and materiality of the question and of the line which it opened. Counsel has referred to the record in this suit, which makes it available to me for use in cross-examination to any extent which may be necessary. I may state that it is not my purpose to go into a technical and expert examination, but that the question is important 207 nevertheless.

208 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

New York, December 3, 1919.
10 A. M.

Further hearing before the Master.
Present: Mr. Johnston and Mr. Edwards.

It is stipulated by and between the parties hereto that the deposition of Horace R. Thayer, taken in Pittsburgh before J. Wood Clark, Esq.,
209 on Monday November 20, 1919, be received in this case with the same force and effect as if regularly taken before the Master, and that this deposition consists of 16 pages of typewritten testimony, and that this testimony may be inserted right after the testimony last taken in this case, and the pages renumbered accordingly, beginning with page 60.

Harry T. Bahr, re-called on behalf of plain-
210 tiff:

Mr. Johnston: Master, the witness has found that there are several errors in the account as filed before you, and has revised it in extensive fashion. I would like to have him explain to you how those er-

rors occurred so that there may be no imputation of bad faith on our part.

Mr. Bahr: At the time I last testified I was presented with a statement by Mr. Edwards showing an abnormal cost per ton on several orders, and at that time I promised to investigate and find out the reason. This investigation disclosed that some of my subordinates who had been working on the accounting had confused fabricating of bars with spiraling and on 212 that account had taken in some instances the cost of fabricating into the cost of spiraling where fabricating bars were shipped with spirals.

By Mr. Edwards:

Q86. I do not quite understand what you mean; were costs of putting spirals and bars together included as to some items where there was no such connection had? A. Some of the orders covered bars as well as spirals, and these bars happened to be fabricated, and as fabrication, whether it is spirals or bars practically meant the same thing to some of the men that had been working on the accounting, they included the cost of both. 213

Q87. In other words, there was a duplication of costs? A. I would not exactly say duplication; there was a charge against spirals which should not have been made.

214 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

Q88. So the costs were excessive as you have stated them? A. In some instances, where bars were shipped together with spirals.

By the Master:

Q89. As I understand the account you now produce shows a profit, whereas the account which you formerly produced showed a loss, is that it? A. Yes, sir.

215 Q90. That is, you included in your former account some costs which should have been charged to bars and which you have included in spirals? A. Yes, sir. I have submitted a schedule headed "No. 1" which gives the items which have been eliminated from Exhibit B which was formerly submitted. The total of Schedule No. 1 deducted from Exhibit B as originally filed will agree with the figures in the summary accounting, showing a profit of $1826.12.

By Mr. Edwards:

216 Q91. You went over the entire account recently when preparing this last statement, did you not? A. Yes.

Q92. And it is correct as far as you know A. Yes.

Q93. And you would like to substitute it for Exhibit B and all the other papers earlier filed A. Yes sir. In the account which I now produce the Exhibit B is to be substituted for th

217

Cost of Spirals sheet in the account filed September 30th.

Q94. I call your attention to the Profit and Loss sheet formerly filed by you, which shows a great many items by order number. Can the same item be identified by the same order number in the paper which you have just produced today, which is marked Schedule B? A. Yes, sir.

218

Mr. Edwards: I offer in evidence the Account Statement filed July 29, 1919.

It is marked Plaintiff's Accounting Exhibit 2.

I offer in evidence the statement filed September 30, 1919, by the defendant.

It is marked Plaintiff's Accounting Exhibit 3.

I offer in evidence the paper this day brought by this witness.

It is marked Plaintiff's Accounting Exhibit 4.

219

Q95. As I understand it, the part of Exhibit 4 which you have marked Exhibit B contains all the order numbers found in Exhibit 3, is that correct? A. Yes, sir.

Q96. But in going over the matter you found some errors, that is, some items which should not be included, and you have put those in Schedule No. 1, which is a part of Exhibit 4, is that correct? A. Yes, sir.

220 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

Q97. And so these items should be deducted from what is shown in Exhibit B? A. Yes, sir; there is one item to be added to Exhibit B, at the bottom of Schedule 1.

Q98. Will you please explain just why these items on Schedule 1 should be deducted from Exhibit B? A. That answer was volunteered by me at the commencement of this deposition.

Q99. Do the items on Schedule 1 cover spirals not attached to bars? A. I am not able to answer
221 that question; I stated so in my previous testimony.

Q100. Do you know what is covered in the part you have marked Exhibit B? A. I was submitted a schedule of the orders covering spirals by our order department, and on those orders I ascertained the costs.

Q101. But you did not know whether these orders covered spirals attached to bars or spirals shipped separate from bars? A. No, sir.

Q102. Or both? A. No, sir.

Q103. Who does know? A. I stated before I
222 thought Mr. McGee could give that information.

Q104. You are not sure? A. No, sir.

Q105. Then you do not know whether or not orders for spirals and bars to be assembled on the job are included in this report? A. I was simply given a schedule of the orders covering spirals, and I do not know whether these spirals had bars attached or not; any helical is a spiral to me, whether it has something attached or not.

Harry T. Bahr—For Plaintiff—Recalled—Direct. 223

Mr. Johnston: Of course, Master, you understand that these records were all made before any reason existed for supposing that they would have to be investigated hereafter; the decision of the District Court was such as to relieve us of any idea of an accounting.

Q106. As I understand it, the first page of Exhibit 4 is a summary statement? A. Yes, sir.

Q107. I call your attention to the fact that in 224
Exhibit B there are four pages, and then the exhibit seems to continue with page 1, which takes a fresh start on a new page; will you explain why that is? A. When the orders covering spirals were submitted to me they were segregated according to the plant in which the spirals were manufactured, therefore I first ascertained the costs of the spirals made in one plant and then the costs of the spirals made in the other.

Q108. I call your attention to the part of Exhibit 4 which is marked Invested Capital; please explain just what that is? A. When I testified before you asked me to inform you the manner 225
in which I arrived at the interest charge included in Summary Accounting. I explained at that time how I did so, but you asked me to give you the details. This schedule gives those details.

Q109. What is the meaning of the column under Capital; does that represent money actually paid in? A. Yes, sir.

Q110. Cash? A. Cash and property.

226 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

Q111. What was the nature of the property? A. Patents and other property.

Mr. Johnston: I think what counsel is getting at is the capital on which dividends are computed.

Mr. Edwards: I object to the item Capital, as being indefinite and showing no definite monetary value, and therefore not suitable for the purposes of computing in-

227 terest.

Q112. I call your attention to the column Surplus, and ask you if that represents cash? A. That represents the profits that the company have earned which have not been distributed.

Q113. Would that be in the form of cash or other liquid assets? A. Other assets, cash and other assets; you may put it in buildings and other permanent assets.

Q114. But that surplus represents actual value to the amount stated, is that right? A. Yes, sir.

Q115. No patent rights or anything like that

228 is included under the item surplus? A. No, sir.

By Mr. Johnston:

Q116. The capital and surplus combined represent actual values in the plants, and so on? A. Yes, sir.

Mr. Edwards: I object to the question as leading.

Objection overruled.

229

By Mr. Edwards:

Q117. I call your attention to the page headed Sales, and ask you if the column at the right indicates the gross sales of all the products of the company? A. That represents the net sales.

Q118. What is the difference between the gross and net sales? A. You may have to allow freight to destination, so the gross sales would represent the amount you bill before allowing the freight.

230

Q119. Then the difference is not very great? A. No, sir—on $15 000,000 worth of business it is quite an item, the freight.

Q120. But only a small percentage? A. Yes, sir. In a number of cases we are called upon to make a delivered price to a customer; when billing the material we charge the customer with this delivered price and allow the freight to destination, which gives us the net selling price.

By the Master:

231

Q121. You mean by that, it represents the net cash which you receive for the goods? A. Yes, sir; if we receive the cash.

Q122. The net payment that is made for the goods? A. Yes, sir; or the amount we are entitled to for the goods.

232 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

By Mr. Edwards:

Q123. I call your attention to the last line of this page, which is "6% for 2¾ years," how did you reach the term "2¾ years?" A. That is the period of the accounting.

Q124. So you charge interest at 6% for the entire period of the accounting? A. During the period that we made the spirals.

233 Mr. Edwards: I object to this item as incorrect on its face; some of these sales were made early and some late, and I should not be charged with interest the entire period.

The Witness: In the right hand column are the sales for the period of the accounting of all products, amounting to $15,000,000. Below this item is given the sales, value of the spirals shipped during the period of the accounting. The ratio of the spiral sales to the total sales gives a

234 percentage of approximately 1%, which used on the average invested capital as disclosed on the previous sheet, gives a figure of $24,758.05, on which interest should be figured for the period of the accounting.

Q125. That is not in dispute, but the question is whether or not interest should be calculated for the entire period of the accounting as if all

sales had been made the first day the accounting commenced, whereas the sales have been made from time to time during the entire period covered by the accounting and therefore the interest rate should correspond, is this not correct? A I don't want to enter into a controversy of that kind, because the manner in which I have submitted these schedules was what in my opinion was correct.

Mr. Johnston: Master, there must, of 236
course, be a time when the interest charge will begin and a time when it ends; that is most conveniently taken as the period of accounting. The investment was not made from time to time, but existed throughout the entire period of the accounting of course as the concern was in business long before that time. If we are to go into the question as to when the investment was made, of course we will go further back and will off-set a larger amount of interest. Any inquiry of that kind must result in abolishing entirely 237
any accounting for any profit whatever.

Q126. Why don't you take the average time for interest instead of beginning 2½ years back; take a period in about the middle of the accounting?

Mr. Johnston: Objected to as asking for a conclusion on a question of law.
Objection sustained.

238 *Harry T. Bahr—For Plaintiff—Recalled—Direct.*

Q127. As you have computed interest you have calculated as you would calculate if all sales were made the first day covered by the accounting, that is correct, is it not? A. I have computed interest in accordance with the statements which I have submitted, which are self-explanatory.

Q128. Is it not exactly the same as it would be if all sales were made the first day covered by the accounting? A. I don't know.

Q129. Have you taken into consideration that
239 the sales were made during the entire period covered by the accounting? A. Yes, sir.

Q130. Were all those sales made over a period of 2¾ years ago? A. I don't understand.

Q131. Were all those sales made more than 2¾ years ago?

Mr. Johnston: Objected to as immaterial.

A. They were made over a period of 2¾ years as stated in the accounting.

240 Mr. Edwards: I object to the item of interest, on the ground that the weight of authority is against the allowance of it.

Q132. I call your attention to your answers to questions 70 and 71, which were given at your last appearance before the Master, and ask you whether or not you can explain the discrepancies therein referred to? A. I have already answered that question.

241

Q133. Will you please answer it again so that it will appear right in this connection? A. In the account made numbered Exhibit 3, there were included items of cost which should not have been included, which was explained in detail by me at the beginning of my testimony here today.

Q134. I call your attention to Exhibit 3, and columns 2 and 4, and ask you if the selling price given in the fourth column applies to the complete order stated in the second column? A. Yes, I believe it does.

242

Q135. That is corrected? A. Yes.

By the Master:

Q136. In Schedule 1 of Exhibit 4, column Manufacturing and Overhead, column of Labor Cost, and column Total, the total is the total of the manufacturing overhead and the labor cost? A. Yes, sir.

Q137. Then the amount to be eliminated from Schedule B is the total? A. Yes, sir.

Q138. And that is to be deducted from the total cost as shown on Exhibit B, is it? A. Yes, sir, according to order number.

243

By Mr. Edwards:

Q139. And the fifth column of Exhibit 3 should be changed accordingly? A. Yes, sir, any deductions would affect the profit and loss.

244 *Harry T. Bahr—For Plaintiff—Recalled—Cross.*

By the Master:

Q140. Take the first item of Schedule 1, Y13007, I find that same item in Exhibit B, I find a labor cost there given of $20.64, but the labor cost on Schedule 1 of that item is $18.25; do you mean that the real labor cost is $20.64 after deducting $18.25 from the labor cost as given in Exhibit 3? A. Yes, sir.

245 By Mr. Edwards:

Q141. I call your attention to Schedule 1 of Exhibit 4, and particularly to the last column entitled "Total," and ask you if the items in that column correspond to the item marked "Cost" in Exhibit 3? A. They don't correspond; they are to be eliminated from costs in Schedule B.

Direct examination closed.

Cross Examination by Mr. Johnston:

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XQ142. Mr. Bahr, in preparing this schedule, and in fact throughout this account, I want to know if you have done so in the same way that you would have done if you had prepared it for your own Board of Directors? A. Yes, sir.

Deposition closed; signature waived.

The Master: I direct the defendant to state whether the account filed shows bars and spirals shipped together only,

or whether it also includes spirals shipped separately also; and to state whether the account includes all shipments of the class which are included in the account.

Mr. Edwards: I want all spirals and bars which are to be assembled on the job so as to embody the patented invention here in suit.

The Master: If the account does not include those to be assembled on the job, then you are to supply an account showing those that are sold to be assembled 248 on the job.

Mr. Johnston: I doubt if we can furnish you an account of that.

New York, February 14, 1920.

It is stipulated and agreed by and between counsel that Harry L. McGee, if called as a witness before the Master in this case, would 249 testify as follows:

1. That the account filed is this case was prepared under instructions from him by a considerable number of subordinates in the office of the Concrete Steel Company and involved the investigation of a large number of entries and records which had not been kept with reference to an accounting in a patent case, but

according to the ordinary course of business of the defendant; and that he therefore is unable to answer fully all the questions which could be based upon that account, but has endeavored to ascertain, as well as he could, the facts relating to it concerning which plaintiff's counsel is inquiring at this time. That account includes all of the spirals and spacers, which are sometimes called "bars", but which in this trade are called "spacers", which were assembled in the shops of the Concrete Steel Company and
251 all spirals and spacers corresponding to the Vandenburgh patent which were shipped for field assembly; and so far as he knows or has been able to ascertain it includes spirals and spacers which were shipped at different times for the same job, the spacers being like those of the Vandenburgh patent.

2. On the other hand, it does not include spirals when sold separately in the form of coils of wire of a size suitable to be used in concrete reinforcement, nor does it include any spacers sold separately, so far as he is at
252 present advised, except in the cases in which spirals and spacers were shipped to the same job for field assembly, which was a very small proportion of the whole amount of material shipped, the bulk of the business being done in reinforcing which was assembled in the shops.

3. It is stipulated that the defendant admits for the purposes of this case that the accounts filed by the defendant in this case July 29th,

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1919 and September 30th, 1919 as finally revised by a supplemental statement filed December 3rd, 1919 and now in evidence as plaintiff's exhibit number 4 set forth all the infringing devices made, used or sold by the defendant during the time stated in the account.

The plaintiff takes exception to the item entitled "Interest on Capital Invested—$4,085.07" on the ground that the same is illegal, incompetent, irrelevant, immaterial and not properly proven.

The plaintiff takes further exception to all 254
items of loss set forth in the account on the ground that such are irrelevant, incompetent and immaterial.

Plaintiff Rests.

Adjourned to March 6th, 1920, at 10 A. M.

256 *Ralph E. Weber—For Defendant—Direct.*

New York, March 25, 1920

Met pursuant to adjournment.

Present: The Master.
Mr. O. E. Edwards for the Plaintiff.
Mr. T. J. Johnston for the Defendant.

RALPH E. WEBER, a witness produced on be-
257 half of defendant, being first duly cautioned and sworn, deposes and says as follows:

Direct Examination by Mr. Johnston:

Q1. State your name, age, residence and occupation? A. My name is Ralph E. Weber; I am of mature years and live at Summit, New Jersey. My business is that of a cost accountant.

Q2. By whom are you now employed? A. I am employed by the Concrete Steel Company and have been for the past five years.

258 Q3. State briefly your education? A. I have had a full academic education and hold the degree of A. B. from Yale University. I entered the employ of the Carnegie Steel Company as soon as I left Yale and was employed there seven years prior to entering the employ of Concrete Steel Company.

Q4. What branch of accountancy do you pursue? A. I am the cost accountant of the Concrete Steel Company and it is my duty to determine the cost of shop operations. For that

purpose, I obtain information which is furnished to me by those who do the work, either directly or through various forms of reports. The figures which I deduce from the reports are those which are used by us in computing the cost of work and are employed for future guidance in preparing estimates of cost when these are furnished to customers.

Q5. Are you familiar with the cost to the Concrete Steel Company of assembling the structure which has been called in these hearings the "Vandenburgh concrete reinforcement", 260 consisting of a verticle bar vefthe Lnavml consisting of a helical coil of wire, which we have generally called a "spiral", attached to an angle bar by slots or kerfs in the edge of the bar, the intervening portions of the bar being then bent down over the slot or kerf, so as to hold the coil of wire in place? A. Yes. It has been a part of my duty to determine the cost of assembling these structures in the past.

Q6. What was the cost to your company of assembling the structure referred to? A. I find that the average cost of assembly of the structure referred to in your questions as the Van- 261 denburgh structure was $4.88 per ton.

Q7. After the Vandenburgh structure was discontinued, the Concrete Steel Company adopted another form of reinforcement, consisting of a coil of wire which was attached to an angle bar by being inserted in slots in the edge of the bar and then having a wire inserted which secured the coil of heavy wire reinforcing is place relative to the angle. Are you fam-

iliar with the cost of assembling this structure? A. Yes. This structure has been sold by the Concrete Steel Company in a number of instances and it has been part of my duty to find out just what it cost, so as to make proper charges to customers in the same way as I did with regard to what you have called the Vandenburgh structure.

Q8. What was the cost of assembling that structure? A. I find that the cost of assembling that form of reinforcement was 5.62 per ton.

263 Q9. Has your occupation made you to any extent familiar with the quantities which are used in particular constructions; for example, the amount of coil and the amount of spacing bar for the coil which would be required for different sizes of columns, having reference to the sizes of the wire in the coil and the weight of the angles. A. Yes. It has been a part of my duty to inform myself to a greater or less extent on the subject inquired of. I am, of course, familiar with the weights per foot run of different wires and shapes which are employed in concrete reinforcement. These are

264 tabulated in standard works on the subject and I have used these tables so much and have, in practice, found them so accurate that I have become familiar with them, to a certain extent. and remember many of the figures without reference to the tables; though, of course, it is my practice to refer to the tables whenever any doubt arises in my mind.

Q10. Have you read and do you understand the testimony given by Bruce Clark White and

Horace R. Thayer on behalf of the plaintiff in this case? A. I have read those depositions and I believe that I understand them.

Q11. I will turn first to the depositions of Mr. White. On the 46th pae of the typewritten record, Mr. White was asked this question: "What do you estimate the cost of wiring on the spirals to be for a column, we will say, having spirals two feet in diameter and containing, roughly, half a ton of material and made of half-inch wire rod." State what would be the length of a column conforming to the 266
conditions stated in the question, assuming the usual weights of the iron in the half-inch rod used for the coil and in the angles used to space it. In your answer, you may state whether a column of the character indicated in this question is or is not a commercial proposition, in view of your acquaintance with that subject, and you may give the reasons why it is or is not. A. The length of a column conforming to the conditions stated in the question would depend upon the pitch or distance between the turns of the spiral. Assuming the pitch to be three inches, the length of such a column with 267
four angle bar spacers of 2″ x 2″ x 1/8″ dimensions would be 423/4 feet. It is my opinion that a column of these dimensions would not be a commercial proposition because it would be a difficult and expensive thing to handle in transportation and on the job. I do not know of any type of building in which such a column would be required.

268 Q12. Mr. White's answer said that the cost referred to would vary according to locality and efficiency of management and supervision; but that it "might amount to $15.00 a ton". Do you agree or disagree with Mr. White's answer and in what respects and why? A. I agree with Mr. White's answer, so far as he says that the cost would naturally vary under the conditions he states. I think however that the work can be done for very much less than $15.00 per ton. A
269 column of the dimensions just described would cost for this work not more than $6.00 per ton, based on the assumption that it would take four men working, at fifty cents per hour, one and a half hours to do the work. This is more than the average column two feet in diameter and made of half inch rod would cost to assemble, however, because the average column would be very much shorter and therefore easier and more economical to handle.

Q13. Mr. White said further on that he could hardly fix the figures closer without having every particular that would affect the cost. Do you
270 agree or disagree with that and why? A. I agree with Mr. White that it would be necessary to have every particular affecting the cost in order to fix a close figure, because the experience and efficiency of the workmen, the shop facilities for doing this kind of work, and so forth, would affect the cost.

Q14. Another question asked Mr. White assumed that a column was 20 feet high, with half

271

inch coil spaced 3 inches apart and 2 feet in diameter. What have you to say as to the commercial character of a column of that description. A. I think it quite possible that there are buildings which would require a column of the dimensions just stated, though it is considerably longer than the average column which the Concrete Steel Company has been making. The distance between floors in the average building of reinforced concrete is seldom as much as twenty feet, and therefore a column as long as that described would be exceptional.

272

Q15. Mr. White said that the cost per ton for such a column for the wiring alone would be about $40.00 for the assembly part alone. If you will read Mr. White's answer, beginning at the bottom of page 47 and ending at the top of page 49½, you will get a more accurate idea of what he said and after you have read it, please state the respects in which you agree and disagree with what he has said, with your reasons. A. I think the cost per ton for such a column for the wiring alone would be more nearly $4.00 than $40.00, for the assembly work alone. The total weight of such a column would be about 467 pounds.

273

Q16. At the bottom of page 49½ Mr. White says "all such estimates are subject to check in actual performance". Do his estimates agree with the checks you have made of actual performance on wired work? A. I agree that they are subject to check. Mr White's figures do not agree with the figures which I have compiled from

work actually done by our concern. From the first of October, 1919 to the end of February, 1920 the cost of assembling 611.79 tons of spirals by the wiring method we use was $3438.58 or an average of $5.62 per ton. The average weight of these spirals was less than 250 pounds each.

Q17. On page 50, Mr. White says "one must have an exact layout of the whole contract to be executed". Does that conform to your experience? A. It is necessary to know the complete dimensions of the columns to be made, to know
275 the rate paid for the labor, and something of the facilities provided for doing the work, to enable one to submit a fairly accurate estimate of the cost.

Q18. On page 51, Mr. White says:

> "In view of the conclusions expressed in my previous replies, and the assumption that the conditions set forth in the questions would obtain ordinarily, my opinion is that a royalty of $12 per ton would be fair and equitable".

276 Is the assumption that the conditions set forth in the questions would obtain ordinarily a proper one? A. The conditions set forth in the questions would not obtain ordinarily. I do not know where or how a spiral column 42¾ feet long and weighing half a ton could be used. Even a column twenty feet long and weighing nearly a quarter of a ton would be exceptional. Any figures submitted on the cost of assembling

such columns could not therefore be fairly accepted as representing ordinary conditions.

As for the royalty of $12.00 per ton, I think it excessive to pay any such amount for the privilege of using a method which yields us no substantial advantage.

Q19. Mr. Thayer says on page 68 in answer to question 24 that he finds the cost of wiring joints to be about $13 per ton, as an estimate. Does that accord with your experience? A. Mr. Thayer's estimate of $13 per ton is high, as we have found if possible over a period of five months to as- 278
semble spiral columns by fastening the rod to the angle with wire at an average cost of 5.62.

Q20. Mr. Thayer gives in the same answer the cost of assembling the Vandenburgh structure, as we have called it, at about $3 a ton. Does that accord with your experience? A. Our experience with the Vandenburgh structure has been that the cost of assembling has been nearly $5 a ton.

Q21. These answers of yours about relative costs have been of actual and not estimated costs, as I understand the matter. Is that the fact? A. Yes, the figures of 5.62 per ton for the 279
wired structure and $4.88 per ton for the other are my records of what it has actually cost to do this work.

Q22. Mr. Thayer, in answer to Q27, says that a fair royalty for the Vandenburgh patent would be $8 a ton. Do you agree with Mr. Thayer? A. If, as shown in the comparison of actual costs which I have submitted, it is shown that the use

280 *Ralph E. Weber—For Defendant—Cross.*

of the Vandenburgh method yields us a saving of only a few cents per ton over the wiring method I cannot see the fairness in a royalty of $8 per ton for the privilege of using the Vandenburgh method.

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281 Further hearing held before the Special Master at his office in the Post Office Building, Park Row, New York City, April 7, 1920.

Appearances:

William Parkin, Esq., Special Master;
O. Ellery Edwards, Esq., for plaintiff;
Thomas J. Johnston, Esq., for defendant.

RALPH E. WEBER, a witness for the defendant, resumes the stand:

282 *Cross Examination by Mr. Edwards:*

The direct examination of Mr. Weber was not taken before the Special Master but was taken by agreement in the office of defendant's counsel without the presence of either the Master or plaintiff's counsel.

It is stipulated that the plaintiff may enter his objections after the cross examination.

283

XQ23. Mr. Weber, I notice that you refer to a wire spacer in your answer to questions 7 and 8, page 94 of the testimony, will you produce a sample of this spacer? A. Yes, sir, we can produce a sample of the spacer?

XQ24. Will you produce also a blue print, a sample and a print, if you can? A. Yes, sir.

XQ25. Will you please turn to your answer to Q6. and state how you derived that figure of $4.88 a ton? A. The reports I get from the shop where the spirals are manufactured showed the tonnage assembly and the amount of money ex- 284
pended in the labor of assembling, it is simply a matter of deriving the average cost per ton then.

XQ26. Will you give the figures, that is the tonnage and the average cost? A. Well, I think that is given later in the direct examination (referring to testimony) I think I covered that—no, that doesn't appear here, but I can produce these figures for you.

XQ27. Will you please do so? A. Yes, here is the exact tonnage, the exact amount of money, the period during which the labor was performed, 285
from which was derived the average cost of $4.-88 a ton.

XQ28. I call you attention to your answer to Q11, page 95, and the following questions and answers which relate to Mr. White's testimony. What kind of spacing bar did you understand Mr. White to be testifying to when he spoke of the prior art other than the Vanderburgh patented structure? A. Does he mention anything

prior to the Vanderburgh—I understood the spacer to be an angle spacer.

XQ29. That was the only one you understood Mr. White to testify to? A. That is the only one I understood him to be discussing.

XQ30. You did not consider a spacer where the coils are held to the spacer by wires only? A. Well that might be an angle spacer.

XQ31. Did you consider a spacer of that kind when you were testifying in your direct, in this case? A. I considered only an angle spacer.

287 XQ32. How were the coils held to this spacer in the embodiment you considered? A. By the wiring method you mean?

XQ33. I asked you what you meant—you made certain comparisons there and reached certain figures? A. I had in mind the Vandenburgh method of attaching the spiral to the spacer and the wiring method that we now use.

XQ34. And those were the only two methods which you considered? A. Yes, sir.

XQ35. And the same applies to your answers to the Thayer deposition? A. Yes, sir.

288 XQ36. Will you now produce the figures called for to show how you reached the sum of $4.88 as specified in your answer to Q6? A. Yes, sir. This figure $4.88 was derived from the reports received by me from the shop, covering the period from March 15, 1918, to May 31, 1919 inclusive. It covered 865.361 tons, assembled at a cost of $4221.59, which gives an average cost of $4.88 a ton.

XQ37. That was shop assembly? A. Yes, sir.

XQ38. It does not apply to job assembly? A. No,—you mean field assembly?

XQ39. Field assembly? A. Yes, sir.

XQ40. Do you know what the figures would be if you covered the entire period of the accounting from August 15, 1916 to May 16, 1919? A. Figures covering what?

XQ41. The cost of assembly in the shop? A. Well that is the cost of assembly in the shop during that period—isn't that the period?

XQ42. No. A. No, I couldn't give you that. 290

XQ43. You did not have charge of the accounting at that time? A. No.

XQ44. Except as stated in your answer? A. Yes, sir.

Mr. Edwards: Cross examination closed. I want to object to the entire deposition as immaterial and irrelevant to any issue in this case, because the measure of damages taken by the witness is subsequent to the infringements and is not available art as of the time of the infringement or as of the date of the patent in suit. 291

Overruled.

Exception.

Adjourned to Monday, May 3, 1920 at 11 a. m.

292 *Fred T. Llewellyn—For Defendant—Direct.*

New York, Monday, May 3, 1920.

Met pursuant to adjournment.
Present: The Master,
O. E. Edwards, Esq., for complainant.
T. J. Johnston, Esq., for defendant.

FRED T. LLEWELLYN, a witness produced on behalf of defendant, being first duly cautioned and sworn, deposes and says as follows:

293 By. Mr. Johnston: Master, according to the agreement entered into with my brother Edwards, I have submitted to Mr. Llewellyn the questions which I will ask him upon his direct examination and he has himself dictated the answers to them. Therefore, the direct examination is already written out and it was served upon Mr. Edwards on the 29th of April. I therefore submit the witness for cross-examination at once.

294 Q1. State your name, age, residence and occupation? A. My name is Fred T. Llyewellyn; I am of mature years and am employed in the office of the president of the United States Steel Corporation as engineer and technical assistant. My residence is Montclair, New Jersey.

Q2. What experience and education have you had in the line of your profession? A. I studied at the Universities of London, England, and Minnesota, U. S. A. Was Structural Steel Draftsmen, four and one-half years; Southern

295 Agent and Engineer for Gillette Herzog Mfg. Company, six years; Contracting Manager, American Bridge Company, four years; Engineer in New York Sales office, for Carnegie Steel Company, eleven and one-half years; during the recent war in charge of steel distribution, United States Shipping Board, six months; in present position one and one-half years.

While employed by Carnegie Steel Company, I gave special attention to the use and sale of steel for concrete reinforcement.

296 Am a member of American Society of Civil Engineers, American Iron and Steel Institute, and a number of other technical organizations.

Q3. What experience have you had which qualifies you to testify about rates of royalties paid for the use of patented inventions in iron work and especially concrete reinforcement? A. I participated in two negotiations for patent rights to produce steel sheet piling am the patentee of a method of constructing interlocking steel and concrete sheet piling; and have negotiated with many patentees of concrete reinforcement for rights to produce and sell under their patents.

297 I have also prepared several reports for my employers regarding the value of patents on other steel products.

Q4. Have you read and do you understand the depositions which have been given in this case by Horace R. Thayer and Bruce Clark White? A. I have read the depositions and I believe I understand them.

Q5. Have you examined the Vandenburgh reissue patent No. 14,182 which is in suit in this case? A. I have.

298 *Fred T. Llewellyn—For Defendant—Direct.*

Q6. State what in your experience have been royalties actually paid for the use of patented iron-work structures of different kinds, including reinforced concrete structures, if any such there were? A. The royalties paid have usually depended on the extent to which a patent has been exploited previous to negotiation.

For patent rights to produce and sell fully exploited forms of steel sheet piling one dollar per ton was paid, and the same rate was paid for a patented deformed bar for concrete re-inforcement, including the assistance of the patentee in
299 marketing the bar.

For an undeveloped patent on steel and concrete tunnel lining a lump sum royalty of twenty-five dollars was paid.

Q7. Mr. Thayer says in answer to Q27 that a fair royalty for the use of the Vandenburgh structure was "about $8.00 a ton" and Mr. Thayer bases that upon his "estimates" of the work of assembling the Vandenburgh structure at $3.00 a ton, and that of a wired structure at $13.00 per ton. Are these figures reasonable, in your opinion? A. I consider a royalty of eight
300 dollars per ton for the Vandenburgh structure to be absurdly high and entirely unreasonable. I have had no detailed experience as to the comparative costs of assembling spirals, but consider ten per cent, of the saving or of the additional profit to be a reasonable measure of the value of such a patent in view of the risk of non-success assumed by the user.

Q8. Mr. Thayer says, on page 5, in answer to Q15 "the method of wiring uses up a good deal of the section of the bar." Is that statement

true? A. I do not see how Mr. Thayer reaches this conclusion. Both the Vandenburgh and the wiring system could be so arranged as to make useless or useful a large percentage of the bar section.

Q9. Mr. Bruce Clark White, page 51, states that for the Vandenburgh construction "a royalty of $12.00 per ton would be fair and equitable." Does that agree with your opinion? A. It does not. My answer to Q7 applies also to this question. I might add that the trade understanding is that the sale of spirals is frequently 302 not profitable in itself, but merely serves to assist in the sale of other concrete reinforcement.

Q10. Mr. White says, on page 56, that there were profits at times of $30.00 per ton upon steel used in concrete reinforcing. How does that accord with your experience. A. I know of no such rate of profit being made on sales involving a fair tonnage, and believe Mr. White must have referred to trivial lots where the selling expense allowed for would be high in proportion to the shop cost. It is my experience that five dollars per ton profit is a very satisfactory total net 303 profit on steel for concrete reinforcing.

Q11. What effect upon the payment of royalty does the fact that the patented structure has been embodied in existing buildings or other structures have upon the rate? A. The payment of royalty under those circumstances has an element of duress in that an injunction against the existence of the buildings or other structure would be disastrous to the licensee; and therefore he would be willing to pay a much larger rate than would be a fair rate in an open negotiation where the licensee had made none of the patented article.

No cross-examination.

304

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant.

305 Testimony of ALBERT L. JOHNSON, Buffalo N. Y., May 7th, 1920, taken by and before Henry Werre, Esq., Notary Public duly authorized pursuant to the Judicial Code, and the equity rules as amended.

Present: On behalf of Defendants, Thomas J. Johnston, Esq.

No appearance on behalf of Plaintiffs.

ALBERT L. JOHNSON, a witness called on behalf of Defendants, being first duly cautioned and sworn, deposes and says as follows:

Direct Examination by Mr. Johnston:

Q1. State your name, age residence and occupation. A. Albert L. Johnson, mature years, president of the Corrugated Bar Company, Inc., residence, Buffalo, New York.

Q2. Do you appear under subpoena or otherwise? A. Under subpoena. 308

Q3. Have you produced the contract between Vandenburgh and the Corrugated Bar Company, which is referred to in subpoena which was served upon you? A. I hand it to you herewith, I do; and I also produce the power of attorney by which Mr. Griffin signed Mr. Vandenburgh's name to this contract. (Witness hands paper to counsel.)

Mr. Johnston: The two papers are offered in evidence as Defendants' Exhibits, Corrugated Bar Company Contract, and 309 Corrugated Bar Company Power of Attorney.

Inasmuch as these are original papers which should not be taken from the files of the witness, the stenographer is instructed to copy them into the record.

DIRECT EXAMINATION CLOSED.

310 LICENSE AGREEMENT.

THIS AGREEMENT, made this 3rd day of October 1919, by and between George E. Vandenburg, of San Francisco, California, party of the first part, and Corrugated Bar Company, Inc., having a place of business in Buffalo, N. Y., party of the second part, witnesseth,

Whereas said George E. Vandenburgh is the sole owner of Reissue Letters Patent No. 14182, dated August 15, 1916, for an improvement in Reinforcing Bars, being a reissue of United
311 States Patent No. 841741, dated January 22, 1907; and

Whereas the said Corrugated Bar Company, Inc. is desirous of obtaining the exclusive right and license to make, use and sell reinforcing bars under said Reissue Patent, and of securing a release for itself and its customers and all users of buildings in which its products may have been embodied heretofore, from all claims of George E. Vandenburgh under the said Letters Patent or Reissue thereof, now, therefore, in considera-
312 tion of the sum of Three Thousand Dollars ($3,000) by said second party to said first party in hand paid, receipt whereof is hereby acknowledged, and of the promises hereinafter contained, the parties hereto have agreed as follows:

(1) The party of the first party hereby grants to the second party the exclusive right and license to manufacture, use and sell reinforcing

bars made in accordance with said Patent and said Reissue Patent, or any improvement or reissue thereof, for the life of said Reissue Patent, throughout the United States, except Hawaii, Alaska, California, Nevada, Oregon and Washington, on the terms and conditions herein expressed and on no other conditions, provided that as to Idaho, Montana, and Arizona this license shall not be exclusive.

(2) The party of the first part hereby releases and discharges the party of the second part and 314
all of its agents and customers, and all present and future owners of buildings in which any of the products of the second party have been embodied heretofore, from all claims and demands of the first party and all others under the aforesaid Reissue Patent or Original Patent, and authorizes and licenses the continued use of all such buildings for the full term of said Reissue Patent.

(3) The party of the second part agrees to pay the party of the first part the sum of Three Dollars ($3) for each and every ton of reinforc- 315
ing bars, which term is intended to cover both the spiral and spacing bar or bars to which the spiral is secured, made or sold by it as disclosed in said Reissue Patent, provided that the minimum royalty from October 1, 1919, to November 30, 1921, shall be One Hundred Twenty-five Dollars ($125) per month, and that from November 30, 1921 to the end of the term of said Reissue

Letters Patent, the minimum royalty shall be Three Hundred Dollars ($300) per month.

(4) The license fees herein called for shall be paid to the first party upon the first day of every third month after the signing of this agreement, in San Francisco exchange, and such fees shall be paid within twenty days after they are due. The second party agrees to keep full and complete books of account showing the amount of reinforcing bars embodying the patented invention sold by it under this agreement, and it hereby agrees to render a statement (verified if requested) of the amount of said reinforcing bars sold by it under this agreement in the preceding three months, with every payment; and said books of account shall be open to the inspection of the first party or his agent at any reasonable time. The second party hereto hereby expressly recognizes the validity of claims 3 and 5 of said Reissue Patent, and agrees not to set up the invalidity of either of said claims in any action based on this contract.

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318 (5) It is understood that the license hereby granted to said second party shall entitle it in turn to license other parties; but in case said second party grants any sublicenses to others, said second party obligates itself to require of said sublicensees statements of account of all reinforcing bars embodying said patented in-

vention made and sold under said sublicense, and also agrees to pay to said first party on account of all reinforcing bars made and sold by its sublicensees, at the same rate as if said reinforcing bars had been made and sold by said second party.

(6) If this license agreement is terminated for any cause, such termination shall not discharge the second party from liabilty to the first party for accounting for all license fees that may then be due. 320

(7) It is Mutually agreed and understood that in the event that claim 3 of said Vandenburgh Reissue Patent shall be decreed by any Circuit Court of Appeals to be invalid or to be insufficient to cover the construction there in suit, then in that case all of the obligations of said second party herein shall cease and terminate, and the license hereby granted to it shall continue to the full end of the term of said Reissue Patent, free and clear of all royalties and license fees.

(8) It is further understood and agreed that this license gives the second party no interest in said Reissue Patent beyond that expressly stated, and that said second party has no interest whatever in the collection of damages from any past infringements thereof, all such claims for 321

past infringements being reserved by said first party.

(Signed at Washington, D. C. today, Oct. 6, 1919.)

GEORGE E. VANDENBURGH,
George E. Vandenburgh by
Carlos P. Griffin,
His Attorney in Fact.

323 Witnessed by G. O. Vass,
(Sad. Union Bk. & Tr. Co. S. F.)

In testimony whereof, the Corrugated Bar Company, Inc. has caused this agreement to be duly executed by its properly authorized officers at Buffalo, New York, this day of Oct. 1919.

CORRUGATED BAR COMPANY, INC.
By A. L. Johnson,
President.

324 (Seal)

Power of Attorney. 325

DISTRICT OF COLUMBIA, }
CITY OF WASHINGTON, } ss.:

Personally appeared before me, WM. H. DORSEY, a Notary Public in and for the District of Columbia, George E. Vandenburgh and Carlos P. Griffin, known to me to be the persons described in the annexed agreement, and they acknowledged to me the execution thereof this Sixth day of October, 1919.

WM. H. DORSEY, 326
Notary Public, D. C.

TO ALL WHOM IT MAY CONCERN:—

In consideration of the sum of Ten Dollars to me in hand paid by Carlos P. Griffin, of City and County of San Francisco, State of California, Be it known that I, George E. Vandenburgh, of the City and County of San Francisco, State of California, have made constituted and irrevocably appointed, and by these presents do make, 327
constitute and appoint said Carlos P. Griffin my true and lawful attorney in fact for me and in my name, place and stead, and for my use and the use of my heirs upon my decease, to ask, demand, sue for, collect, receive and receipt for any and all sums of money that may be due or owing or payable to me as the inventor of the reinforcing bar covered by letters patent of the United States #841,741, dated January 22nd, 1907, and reissue patent on the same subject and patent number 14,182, dated August 15th, 1916, for the life of

said reissue patent irrevocable and with an interest in the subject-matter hereof, giving and granting unto my said attorney full power and authority in and about the premises to collect for me any back royalties that may be or become due, and to make, give or grant licenses, agreements, rights or powers to manufacture, use or sell concrete reinforcing bars made in accordance with the disclosure of said patent and reissue patent for any term or territory within or throughout the United States, and with power to use all due
329 means, course or process in law or equity for the complete execution of said collections, licenses, agreements, rights or powers, with the some force and effect as if executed by me in person. And to appear in any action brought upon my behalf on said patent or reissue patent before any necessary judge or tribunal in any place throughout the United States, and with power to continue such actions, licenses, agreements, to release and settle with any person or corporation for back or future royalties, or licenses, with power to continue such effort as he may make upon my death
330 for the benefit of himself as his interest may appear, and for the benefit of my estate and heirs, as well as giving him power to appoint associate attorneys for the purpose of representing me and him in any suit or suits that may be brought in my name on said reissue patent, and I hereby affirm, ratify and approve all acts he or his associates may take under this power and by virtue of these presents.

331

IN TESTIMONY WHEREOF, I have hereunto set my hand and seal at San Francisco, California, this 13th day of January, 1917.

GEORGE E. VANDENBURGH.

State of California,
City and County of San Francisco, } *ss.*:

332

On the 13th day of January A. D. One Thousand Nine Hundred and Seventeen before me, HENRY B. LISTER, a Notary Public in and for the City and County of San Francisco, State of California, residing therein, duly commissioned and qualified personally appeared GEORGE E. VANDENBURGH, known to me to be the person whose name is subscribed to the within instrument, and acknowledged that he executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal, at my office in said City and County of San Francisco, the day and year first above written.

333

HENRY B. LISTER,
Notary Public.

In and for the City and County of San Francisco and State of California.

334 *Notary's Certificate.*

UNITED STATES OF AMERICA,
Western District of New York, } ss.:

I, HENRY WERRE, a Notary Public duly authorized under the laws of the state of New York, having authoriy in and for the County of Erie in said state, do hereby certify that on Friday the 7th day of May, 1920, at 10:30 o'clock in the forenoon, I was attended by the witness Albert L. Johnson, who being by me duly cautioned and
335 sworn to tell the truth, the whole truth and nothing but the truth in a cause depending in the District Court of the United States, in and for the Southern District of New York, wherein George E. Vandenburgh is the plaintiff and the Concrete Steel Company is the defendant, did depose and say as by his deposition hereunto annexed doth appear.

I do further certify that I was attended by Thomas J. Johnston, Esq., on behalf of the defendant, and that no counsel appeared on behalf of the plaintiff.

336 I do further certify that notice was given to counsel for the plaintiff as appears by said notice returned herewith.

I further certify that the exhibits referred to by the witness were returned to him, and that a copy thereof made in the deposition of the witness is a true copy of the same.

I do further certify that I am not related by blood or by marriage to either of the parties or to their counsel nor am I interested directly or indirectly in the event of the cause.

113

Notary's Certificate. 337

And I further certify that at the conclusion of the depositions after they had been written out by a stenographer I sealed the same in an envelope and addressed it to William Parkin, Esq., Master in Chancery, Postoffice Building, New York City, and that I endorsed upon the envelope the title of the case.

In Witness Whereof, I hereunto set my hand and affix my Seal of Office this 11th day of May, 1920.

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Henry Werre,

(Seal) My commission expires March 30, 1921.

340 *Case.*

Further hearing taken at the office of the Special Master, Post Office Building, Park Row, New York City, May 28, 1920.

APPEARANCES:

WILLIAM PARKIN, ESQ., Special Master;
O. ELLERY EDWARDS, ESQ., for the Plaintiff;
THOMAS J. JOHNSTON, ESQ., for the Defendant.

341 Mr. Johnston: I call on plaintiff to produce a contract made between George E. Vandenburgh, plaintiff in this case, and The Corrugated Bar Company, being dated October 6, 1919 and purporting to be a contract of exclusive license. It has a bearing upon the question of proper amounts of royalties, being a contract for that purpose. I also call on the plaintiff to produce a copy of the power of attorney given by Mr. Vandenburgh to Mr. Carlos P. Griffin by virtue of which he executed that contract. In default of the production of these documents I offer to the Master the evidence of
342 Albert L. Jackson president of the Corrugated Bar Company which I understand has already been returned to the Master by the officer who took the deposition, as evidence of the contents and execution of the two instruments referred to. I also offer the decision of the Circuit Court of Appeals of the Third Circuit in the suit of George E. Vandenburgh against Electric

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Welding Company, No. 2479, October Term, 1919. This is not certified but the case has now been reported in 263 Federal Reporter, page 95. I offer this opinion as an exhibit and will mark it Defendant's Accounting Exhibit Electric Welding Opinion.

It is marked Exhibit C.

Mr. Edwards: I will reserve all objections until I can communicate with senior counsel in San Francisco, it may be that the exhibits can be admitted without ob- 344
jection.

Mr. Johnston: I also ask the Master to order the production before him of the contract of license with the Concrete Steel Products Company to which Mr. Griffin on page 5 of the accounting record has testified, and in default of the production of that document I shall object to the testimony of Mr. Griffin, which was stipulated, as secondary and irrelevant.

Mr. Edwards: I will have to communicate with Mr. Griffin about this also, I know 345
nothing about it.

Mr. Johnston: Mr. Edwards, have you any objection to stipulating that the exhibit which I now show you is a sample of the structure which was made by the Electric Welding Company and which was in issue in the suit in the Third Circuit, the decision in which is reported in 263 Federal Reporter page 95?

Mr Edwards: I have no knowledge of this structure, I never saw it before and I

346 *Ralph E. Weber—For Defendant—Direct.*

do not know what the Electric Welding Company made in precise detail, although I did look at the paper exhibits as well as the record in that case. If counsel for the defendant wishes I will be glad to send this model to San Francisco and receive definite instructions as to whether or not we will admit it.

Mr. Johnston: I do not wish to introduce the entire record of the Electric Welding suit before you if that can be avoided, as
347 it is something over a thousand pages, I believe. In the absence of my brother's senior, I ask permission to give testimony concerning this exhibit as if it had been approved, leaving to a later date proof of its authenticity. I will state that it has been furnished me by the Electric Welding Company itself, though I realize that that is not competent and adequate proof; but I think my brother's senior will no doubt stipulate that it is.

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RALPH E. WEBER being duly sworn and examined as a witness for the defendant testifies as follows:

By Mr. Johnston:

Q. You are the same Ralph E. Weber who has already testified in this case? A. Yes.

Q. And your business is still, as I understand it, that of an experienced accountant of the Concrete Steel Company? A. Yes.

Q. Is it your duly in that position to make estimates of the cost of the various structures which that concern puts out? A. It is not so far as new constructions are concerned, as a matter of fact the products which we produce have been produced ever since I have been with the Company—practically all.

Q. But it is your business to estimate costs? A. Yes. 350

Q. And for that purpose you are familiar with the various elements which go into the cost of manufactured structures produced by your company? A. Yes.

Q. You have already testified concerning the cost of assembling spacers and spirals made by the Vandenburgh patent—please examine the sample which I now show you and which is marked for identification Defendant's Accounting Exhibit D, and state the relative cost of assembling that structure in the lots which would ordinarily be required in contracts made by your company if it were put out by them, and compare that cost with the Vandenburgh patented structure to which you have already testified? 351

Mr. Edwards: I object to the question on the ground that the witness is not shown competent to testify as to this structure.

Objection overruled.

Exception.

352 *Ralph E. Weber—For Defendant—Direct.*

A. I think the cost of a structure of this nature, so far as the labor is concerned, would probably be about the same as that of the Vandenburgh structure.

Q. Is there any difference and if so what, between the cost of preparing the tongues which appear on this exhibit as a means of holding the spiral in place, and the kerfs or spurs which appear in the Vandenburgh patent for the same purpose? A. I think there would be no material difference in the cost of the labor of punching in
353 this manner as compared with the Vandenburgh structure, it is simply a matter of punching; one operation of a punch performs the work in both methods.

Mr. Johnston: I do not want to argue the case on the record, Master, but I think the Master will forsee the difficulty there is in obtaining direct evidence from competitors of their costs. It is well known that no court will order one concern to expose its costs to a competitor, and therefore I submit the witness' opinion as the best
354 evidence which I can obtain for that purpose. Whatever weight it may have, it is the best I can do at the present time.

Direct Examination closed.

355

Cross Examination by Mr. Edwards:

Q. How are the kerfs made with the Vandenburgh structure? A. The angle is passed through a punch, there is a set of dies, and as the angle passes through the punch the workman presses with his foot, releases the clutch and the die passes through the angle making a hole in the flange.

Q. Is the punch a rotary punch or a reciprocating punch? A. I don't know the difference.

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Q. You do not know whether or not the kerfs are punched by being passed between rollers with projections and indentations? A. They are not passed between rollers.

Q. That much you know? A. I know that.

Q. But you do not know whether the punch reciprocates or whether it rotates? A. No, I don't know the difference between the two types of punch.

Q. How about the way in which the structure before you, Defendant's Exhibit D for Identification is made, is that made by a reciprocating punch or a rotary punch? A. I don't know.

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Q. You never saw Exhibit D for Identification made, did you? A. No, I never did.

Q. You did not know what it costs to make it? A. No, I have no data on what the actual cost is.

Mr. Edwards: It is stipulated by and between the parties hereto that it is the custom of the defendant to give an order

358 number to each shipment, and such order numbers appear in the statement of account filed by the defendant in this case. Sometimes there are two order numbers which relate to one charge, when the shipments are on different dates then the order numbers are bracketed together. It is always one order number for one customer.

Adjourned subject to notice.

359 ———

Further hearing held at the office of the Special Master, at the Post Office Building, Park Row, New York City, June 17, 1920.

Present:

WILLIAM PARKIN, Esq., Special Master;

MESSRS. EDWARDS and GRIFFIN, for Plaintiff;

360 MR. JOHNSTON, for the Defendant.

Mr. Griffin: It has recently come to my notice, through investigations made subsequent to the receipt of your report, that a much larger amount of spiral steel re-enforcing than you have accounted for, has been sold by the Concrete Steel Company.

during the period of this accounting. I will, therefore, request that the case be re-opened upon the part of Plaintiff, and that Defendant be required to produce such additional witnesses from its bookkeeping and engineering staff as may be able to give me the information required concerning this additional spiral steel.

Mr. Johnston: I do not understand that plaintiff is entitled to an accounting of anything except the combination of the patent in suit; spirals alone are not that 362
combination, and we decline to give the information requested, certainly in the ambiguous and general form which is asked for at this time. So far as I know, all of the spirals which were made for use in the combination in the patent in suit are included in the account. I have been so assured by the defendant's accounting officers, and I do not know of anything further which should be accounted for. The call is so indefinite that I am not able to answer more specifically 363
now.

Mr. Griffin: At this time I demand from you a full and complete account of all spirals sold by your company for use with bars having integral prongs for attaching the spirals thereto, or for spirals sold by your company where you sold the bars separate from the spirals to be attached thereto by the persons purchasing the bars and spirals, and particular-

ly that you point out in the present account or supply a new account showing the amounts of spiral steel reinforcing of the type referred to in the injunction and decree in this case, where such sales were made to the Turner Construction Company, U. S. Army Base, South Brooklyn, U. S. Naval Base, Brooklyn Navy Yard, New York Belting and Packing Company, Passaic, N. J., Bridgeport Screw Company, Bridgeport, Ct., Kahen & Feldman, Wyckoff and Suydam Streets, Brooklyn, Otto Heineman Phonographic Supply Company, Newark, N. J., Julius Kaiser Building, Brooklyn, Standard Oil Company, Perth Amboy, N. J., William Steele & Sons, Philadelphia; and further, that you file a report showing the amount of spirals sold the Government or to any other person or contractor in connection with the construction of the Philadelphia Army Supply Buildings, the Army and Navy Supply Buildings at Boston, New York and New Orleans; and that you file a further report showing the amount of spiral steel reinforcing of the type referred to in the decree herein, sold to the Government for any of its army and navy buildings, all to cover the period of the accounting; and I further specifically request, in view of this information that has just come to my hand, that in the report to be hereafter filed, by your company, the name of the job to which the

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spiral steel reinforcing has been sold be indicated upon the report in order, that the truth or falsity of the report may be checked. I want the report also to conform to the old so that we can compare it by order number and so on.

Mr. Johnston: So far as the first call is concerned, that for all concrete reinforcing containing a spiral and a bar with integral spurs, I shall, of course, refuse to furnish any such information, as the Vandenburgh patent covers no such construc- 368
tion as that, and has been severely restricted by the courts. The devices in the Electric Welding suit, which have been held not to infringe, contain integral spurs.

So far as the call for information of devices furnished to the Government is concerned, it is obvious that counsel is not familiar with the statute and that that is a subject of an application to the Government for relief, to its Executive Department, or by suit in the Court of
Claims. The amendment to the statute 369
absolutely bars suit against contractors who furnish goods to the Government. That situation arose in the wireless cases and was dealt with by Judge Hough and afterwards by the Supreme Court of the United States; in view of the court's decision, Congress amended the statute to make the exclusive remedy of patentees against the United States so that we will

refuse to furnish any information whatever along that line.

The request that the names of purchasers be furnished has already been refused by the Master, and no permission has been given to reopen that subject.

The whole motion to reopen is objected to for want of notice, and for want of any support under oath whatever. The mere statement of counsel is wholly insufficient to justify a motion for reopening, which is a serious matter and is not 371 at all a matter of course after the defendant has practically concluded its testimony. On the contrary, there must be a verified showing, not only of facts but of diligence in ascertaining the facts.

So far as sales of spirals, which do not in themselves embrace the combination of the Vandenburgh patent, is concerned, we will refuse to furnish information. The sales which were made to persons who intended to assemble them in the Vandenburgh combination on the job, 372 were included in the report, as the stipulated testimony of Mr. McGee shows.

I believe that all of the items which counsel has called my attention to by his statement on the record, which is unsworn and insufficient as a basis for any action by the Master, are included in the account as filed. That is my information at the present time. I am assured by responsible officers of my client that they

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have twice gone over the books, the second time after finding that the first account had made improper allowances of costs, and that all of the spirals and spacing bars sold to be used together in the Vandenburgh combination, have been accounted for. Under the circumstances I think there is no showing for the Master's justifying the granting of any motion whatever to reopen or to state any new account.

Furthermore, counsel had ample opportunity, by examination and cross-examination to develop any errors which occurred. All of this could have been done at that time, and the fact is that the motion is fractious. 374

Mr. Griffin: In view of what counsel has said, and the admissions made by counsel, there is no necessity for a verified showing as to the facts of the defendant's not rendering a complete account. Counsel's own admissions showed the incompleteness of the previous account, and I now demand that it be made complete. 375

Mr. Johnston: General statements of that kind, Master, are of no value to you in determining the point. Our responsible statement is that we have accounted for every spiral and spacing bar sold to be assembled in the manner of the Vandenburgh structure, whether made in our shops or sent outside. For mere spirals alone we refuse to account because we

don't know how they will be assembled and we are not responsible for them.

The Master: I haven't looked at the statute and I do not know what the statute which you mention provides. I will look at that statute and decide on that.

Mr. Johnston: It is unfair to us to have Mr. Griffin put on the stand—let him furnish, by affidavit, the information on which he bases his statements and then we can investigate it and make counter affidavits if necessary. I cannot cross examine Mr. Griffin intelligently now unless I know the facts. It may well be that with the call he has put on the record to guide us, I may be able to have a full knowledge of all the facts, but if he puts in an affidavit which will cover when he found out these things and what the things are which he found out, and who is his authority for these statements, then I will have something to go on. As it is now, if he should go on the stand and put down all those things, I have nothing at all on which I can cross examine.

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The Master: I will defer his cross examination, to give you a few days to look it over.

Mr. Griffin: I will prepare the necessary affidavit and file it.

With respect to the statute counsel refers to, I have to say that in this case

the jurisdiction attached prior to the enactment of the statute, since the suit was filed prior to the declaration of war.

I will supply the affidavit and motion.

Adjourned to Wednesday, June 23, 1920, 10:30 A. M.

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Further adjourned to Friday, June 25, 10 a. m.

Met pursuant to adjournment, at the office of the Special Master, Park Row, New York City, June 25, 1920.

Present: The Master; Mr. Griffin; Mr. Johnston.

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The Master: What is your motion?

Mr. Griffin: This motion is that the case may be re-opened to the extent that defendant be compelled to account for the additional tonnage of spirals indicated in the affidavits filed heretofore.

Mr. Johnston: Is that all?

Mr. Griffin: That's all. Or that such further explanation be made by defendant

as will account for the additional tonnage of spirals indicated in the affidavits.

Mr. Johnston: Now, master—the first thing before the master is to determine whether any additional tonnage of spirals is indicated in the affidavits. There is nothing in any of the affidavits, Master, which shows that any of this work is outside of the account, not a word, not even an allegation that it has not all been accounted for. We take up the first one—first of all
383 before we go further, I will take the question of diligence in bringing the motion.

My brother Griffin says that the last time he was in New York was in October, 1919, after the filing of the account of the defendant herein, at which time he was advised that the account did not present items for large amounts of spirals of the type referred to in the decree herein. That is not a statement that defendant did not present all that should be presented, it is not a statement that anything which the defendant was advised of was not included in the
384 account; it was simply that it did not present items for large amounts of spirals. There is no showing at all that there was a large amount omitted; not even an allegation that there was anything omitted. It is true that defendant did not present items for large amounts of spirals, because they did not exist in the books of the defendant and there is no showing that they had exist-

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ed. Furthermore, that was October 1919; the case was closed in February 1920. In other words, the matter was allowed to rest in that situation for more than 4 months and nothing was done about it. I want you to take note of the character of these allegations in the affidavit, "not until his return in June, 1920, did he learn from reliable authority"—in other words, my brother has gone around, made inquiries and people have told him certain things; that is hearsay, and is objected to on that ground. 386
None of the people have verified what they said to him. Furthermore, he has stated that he was "informed by persons who were also asked to supply spirals on the buildings"—that is to say, defendant's business competitors. That is hearsay also, and of hostile people—defeated contractors; you know what that kind of gossip is. There is nothing in this affidavit that is not hearsay—tertiary rumor—not even hearsay.

Now as to these various items; we have 387
been wholly unable to find out about them, except in two cases because of the failure to give us the people to whom the goods were shipped. William Steel & Sons is a definite firm, that we were able to look up because goods were shipped to them directly and I find there were 20 items of infringing construction shipped to them, which are included in the account; also several

hundred tons of steel shipped to them not included in the account because it did not embrace the Vandenburgh construction; some of it was coils of wire from which spirals can be made, or Havemeyer bars, which are not involved in this account. The patented construction of Mr. Havemeyer differs in every respect from this and is not alleged to infringe; others were plain steel strips. Now my brother says there were 250 tons
389 of spirals—he doesn't give the source of his information—shipped to William Steel & Sons but he doesn't allege 250 tons of the Vandenburgh structure. In the call which my brother put upon the record he called for information regarding all structures having integral spurs, but our Court of Appeals has held him strictly limited to his one form shown and described, of a spur cut into the edge of a bar. Of course if it means that any form of spur were to be reported, that is beyond the Master's power
390 because it is not alleged that they infringe. The Court held that the broad claims which would cover such a construction are not valid and that is outside of the account. I won't say we have not made structures of that character, but all where a spur has been cut into the edge of the bar have been reported, and we have made no other form except the wire construction.

The Master: You say no other form except the wire construction or the one that is cut in the edge?

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Mr. Johnston: We have made the Vandenburgh construction on a small scale and when the injunction was issued that was discontinued, and since then no construction of that character has been made where the bar itself was used to secure the spiral on a form like the Electric Welding Company sample which I showed you, but our form is, and it has been the only one, where the spiral is wired in.

Now the Bridgeport Screw Company— 392
that was made before the re-issue date and of course was not to be accounted for under well known principles. That amounted to seven tons, my brother says, and he is correct in that much.

But the other things we do not know about. The method of keeping the books has been that the goods were sent to a contractor says John Smith of Brooklyn, New York, such and such a terminal, Wherever it happened to be, that would be all. Now the bill of lading would show just that; Smith himself would claim the goods at the 393
terminal and would take them wherever he chose, we do not know where they went or what became of them. Under the circumstances all goods going to Brooklyn went to a contractor and all goods that went to Philadelphia—shipped to Philadelphia—would go to a contractor. We have not the names of the contractors, we don't know and can't find out where the goods were used, that trouble runs all the way

394 through this thing. We don't for instance have an account with the "Army Base Building;" we have it with a contractor, and he may have that building and may have other buildings where goods went. As far as the Army Base Building is concerned, our information is very imperfect; we have not been able to run down just what went there; but we have heard—just as my brother Griffin has from other people —that what was shipped to the United
395 States Army Base Building was coils of wire not attached to anything. Of course we are not responsible for that. I believe a good deal of that was shipped.

Now you see what my brother has done is this: he has gone around and found a building that used say 150 tons, he cannot find an item of 150 tons in the account then he says we have not reported that building. But take William Steel & Sons. On my copy of the affidavit I have a memorandum of the various items of Vanden-
396 burgh construction, all of which are reported and amount to 104,000 pounds, William Steel & Sons, but they vary from 231 pounds up to 18,000 pounds, single shipments. It is impossible to come to any conclusion that way. Mr. Griffin's affidavit shows that was contained in the memorandum which I have filed with you, at the end of it:

(Reading from affidavit.)

Now the method of keeping the books has been of course to charge the contractor with so much money and to credit him with so much paid for, and that is all that is shown on the individual ledger. There is no reason for putting on that ledger the amounts, the different amounts of steel—they would have to be gathered in the various shops at Youngstown, Philadelphia and other places—I think there is one other, I have forgotten where—now take Mr. Griffin's second affidavit: 398

(Reading from affidavit).

When? If since July 1st, 1919, of course we are not accountable. It is not alleged that the stuff which was sent infringed the Vandenburgh patent.

(Reads further from affidavit).

Were attached—when, where, by whom?

(Reading) "which spiral steel deponent was advised by one Major Foster"—who is Major Foster, why is his affidavit not produced? What was the source of his information? Was he in charge of the work or 399 not? That's rubbish to put in stuff like that. "That said official also informed deponent that the Concrete Steel Company, defendant herein, also furnished the spiral steel," * * *" It has a right to furnish spiral steel. There is no allegation that the spiral steel according to the Vandenburgh patent was attached to spacing bars having the bars kerfed—not even an allegation, only hearsay proof.

(Reading).

I suppose that means four spacing bars for spirals—how were they attached, when, where and by whom? If not by us or furnished by us, we are not accountable to my brother for that.

(Reading) "That many other plans of concrete buildings are on file in said department * * *" Is that a statement from my brother as to where his information was derived? What of it, if so?

401 "Spirals of the type covered by the decree herein." That would mean more if my brother had shown by his call for all of the spirals attached by integral spurs what he was giving as the scope of the claim—I don't know if he means spirals which infringe the Vandenburgh patent or spirals which do not—the court has refused to uphold the contention that all integral spurs are covered—

Mr. Griffin: At this point, may I say I am perfectly content to rest the call upon

402 the decree.

Mr. Johnston: On the wording of the decree?—I am not. The call will have to rest upon the wording of the decree as determined by the opinion. That is elementary. The decree doesn't mean any kind of integral spur, it means the kind set out in the opinion of the court.

(Reading further from affidavit). "That it would require several weeks of search-

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ing to enable all of the data with respect to the large quantities of spiral steel reinforcing used in the government buildings to be obtained." Well, what of it? It isn't up to us to do that searching. It is up to my brother to prove his case. That is the weak point of all this contention, having months to make this search, having a representative here in New York who could get it for him if he was not here, he hies himself away to San Francisco until we have redistributed all the 404
data from which search was made in our files, sent it to the people to whom it belonged, then he wants us to go over it a third time. The request is utterly unreasonable.

I want the master to note very particularly the generality of these allegations; "large quantities of steel which are not shown in the account filed herein." Certainly we have sold millions of pounds of steel not shown in the account, but not steel according to the Vandenburgh patent, 405
that's a very small matter in our business, comparatively. Our sales, for example, of the Havemeyer bars represent possibly a thousand times all the Vandenburgh construction we have ever made, and other characters of steel which we sell for reinforcing.

The Master: Is the Havemeyer bar a bar for spiral?

406 Mr. Johnston: No, sir, nothing to do with it, a bar made of heavy section in a particular way so as to take hold of concrete, but has no spiral in the construction at all.

Now take up this sheet particularly (page 2 Mr. Griffin's affidavit of June 18), the allegation is made "upon the detail prints of several of the buildings referred to on the print herewith the name of the Concrete Steel Company occurs * * *" and further general allegations about
407 other buildings. The master can go over this sheet particularly.

The Master: I have.

Mr. Johnston: You will find there is not one item on there which mentions the spiral reinforcing, this is a mere makeweight and has nothing to do with the case. If any other complaint showed spiral reinforcing according to the Vandenburgh patent, that would be perhaps suggestive (but not conclusive) that that type of spiral reinforcing was used in the building. That's the weak
408 point of this whole thing. If my brother had said, "I went down to such a place and saw such a building which was erected during the accounting period, and which has Vandenburgh reinforcements in it, which I saw myself," and make some sketch showing what he saw so that you can see for yourself it is the Vandenburgh reinforcement, then produces affidavits to verify the question of date, and produces authoritative statements from someone who knows

that that was furnished by my client, and then show somehow or other—how I don't know—that it was not included in the account, you have something before you; but on the present showing the affidavits are as full of holes as a buckskin undershirt. There is nothing to them except rumor. My brother is suspicious that the account doesn't show all that was made and our people swear that it does, of the Vandenburgh reenforcement—it is a small part of their business. Their total sales are millions of pounds a year of steel. There is no showing before the Master for re-opening at all. My brother's fundamental error is in thinking that the Master will call for repeated accounts from us—that is not true. We have filed our account and when that was found to be erroneous by ourselves—no, it was by me—I corrected it by another new account, which necessitated going over it from one end to the other, and that corrected account stands. My brother has had his day in court to show what was not right by the testimony of the men who made the account. They were here, ready to be cross-examined, if necessary. Who did he call? First the sales agent, Mr. Barbour. Mr. Barbour's examination was devoted to showing not what was in the account, not to showing any error in the account or that it was correct, but to trying to find out

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from the man who was a mere sales agent, what the company was then making, although we were perfectly willing to furnish samples of what the company was then making, and as a matter of fact did so; and then called Mr. Bahr who prepared the account and every question he answered fully, some of the questions he could not answer, and the Master gave him an opportunity to investigate and come again and answer, which he did. The trou-
413 ble was that the gentlemen did not take the trouble to go into the account with any thoroughness at the time when they were bound to do so. Now, when counsel says "plaintiff rests," that is not mere social conversation; it is a formal and deliberate statement that the plaintiff has closed his case, and it is now for the defendant to put in his testimony to show that plaintiff has not made a case, or to controvert such case as he has made.

Not one of these things is there which
414 could not have been investigated to the extent that it has been investigated and made the basis of further examination of witnesses, but what had occurred and was known to counsel then. The statement that he did not discover them till June doesn't show that he made any effort to discover them; when he says he was advised in October that the account was incorrect. My brother filed with me or sent me by mail a copy of the affidavit by Mr. Vandenburgh. Mr.

Vandenburgh falls into much the same error as my brother did, and I assume my brother assisted him, as was natural, in the preparation of his affidavit. 415

(Reading from affidavit) "That within the last week he has ascertained from Roslyn Supply Company that the spirals referred to were made by and purchased from the Concrete Steel Company." Made by and purchased from the Concrete Steel Company is the allegation; but how am I to investigate the knowledge of a corporation informed about a corporation. That is purely secondary evidence on the part of Mr. Vandenburgh. I don't know what building he has reference to at 15th Street and Vermont Avenue, Washington. I would not wonder if he meant the building at the corner of H Street which many people mistake for 15th Street, but we don't know from that to whom the steel was shipped or what it was. It is not shipped to a job, it is shipped to a man, and he takes it to such job as he may be advised. 416

Further he says: "a large amount of spiral concrete reinforcing such as is covered by the decree in the above entitle action." Is Mr. Vandenburgh under some misapprehension as to what is covered by the decree? If it is any form of integral spur including wire construction, why he should say so. There is no statement, there is no pinning it down to construction. 417

418 If I may summarize my objections, Master, to this: in the first place there is no diligence shown in acquiring the information; second, there is nothing in the information which shows that any statement in the account is incorrect, or that anything has been omitted from the account which should have been included therein; that there is no allegation to that effect, and certainly no proof; third, that what is in these affidavits is almost entirely hearsay and
419 much of it is impossible to run down, because the names of informants even on hearsay, are not given, nor are their affidavits produced. The thing hardly amounts to hearsay because, these people not being produced, you cannot say whether they are given information of things they know, or things which someone has told them. Very often people who are not lawyers imagine that what they have heard someone say who ought to know, is their own knowledge. In the current
420 Law Journal for June 19, 1920 page 1006, the City Court said about a motion which has some analogy to this: (Reading from Law Journal). The curious part of it is that the Judge who decided that didn't give the name of the case in which he was rendering a decision, but it is in the last column on page 1006.

I have cited some other cases in my memorandum which show the character of

the evidence that should be brought before you. What should be done was to have produced some form of a drawing with the testimony of some respectable person that that drawing showed matter which was not included in the account and which infringed the Vandenburgh patent embodied in some structure at some definite place which could be investigated. Not a single instance is given. It seems to me the motion lacks any vertified showing at all. 421

Mr. Griffin: I have nothing further to say, I am not endeavoring to cumber the record. I am content to rest as the matter stands. 422

The Master: I don't see that you have made out any case that would justify me in opening this case and calling upon the defendant to furnish a further account.

Motion denied. Have you closed your case now?

Mr. Johnston: I hope to close certainly the first part of the week, if I can get a witness I have in mind who is in New York and whom I have been trying to get. If I can't I will have to go to Pittsburgh a second time to get him. It is due to a misunderstanding on his part that I have been unable to get him. 423

Mr. Griffin: I would like, inasmuch as Mr. Johnston has indicated that he will close his case at an early date with the testimony of the witness with respect to the construction at issue in the Pittsburgh case,

424 *Alexander M. Bell—For Plaintiff—Direct.*

I would like at this time to take my rebuttal testimony and finish the case as far as I am concerned now, subject to such additional rebuttal testimony as I might find necessary to put in, owing to such testimony as Mr. Johnston might develop.

The Master: I think I will do that Mr. Johnston, it will save time and cannot do any harm.

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ALEXANDER M. BELL, being duly sworn and examined as a witness for the plaintiff testifies as follows:

By Mr. Griffin:

Q. Mr. Bell, what is your occupation? A. Assistant Clerk, United States Court of Appeals.

Q. And as such Assistant Clerk do you have
426 charge of the records and models that are filed with the Clerk? A. Yes, sir, not filed, left with him.

Q. I will show you a model and also a copy of patent 1,159,297 and ask you if you recognize ever having seen the construction indicated in the patent in the model? A. I don't believe I could identify the article you show me, but I have seen something very similar.

Q. In what case? A. The case of Vandenburgh against the Concrete Steel Company as

far as my recollection goes, I think that's the title.

Q. Do you recognize the similarity between the patent drawing and the model I am showing you? A. I don't know that I have ever seen the patent drawing before.

Q. You know something about drawings? A. Yes.

Q. Do you recognize the similarity between the construction of the model and the construction indicated in the drawing? A. Yes, I think so.

Q. It appears to be the same thing? A. Yes, 428
as far as my knowledge goes.

Mr. Johnston: Master, I don't think it is competent to examine Mr. Bell on patent drawings, as things of that character are not within the scope of his duties—the question of identity of records is a different matter.

The Master: Are you objecting to the testimony?

Mr. Johnston: I object to any question which assumes expert knowledge on the 429
part of the witness—questions of identification are a different matter, I don't object to his identifying anything he has seen.

Q. Do you remember one of the small models filed in the Vandenburgh case, similar to this model I have just shown you? A. I remember an exhibit being left something similar to the

430 *Alexander M. Bell—For Plaintiff—Cross.*

model you show me—the exhibits are never filed here, Mr. Griffin.

Q. Do you know what became of that particular exhibit? A. Well, I know some exhibits were removed by the firm of Emery, Varney, Blair and Hoguet.

Q. Do you know whether this particular one was removed or not—the small model, plaintiff's exhibit 5 on the trial of the case? A. As far as my recollection goes, the large one over there and the small one—

431 Q. What became of the exhibits in the case? A. The exhibits were removed on June 4, 1919, by the firm of Emery, Booth, Janney & Varney.

Q. How did you determine that? A. I have a memorandum on the docket on my calendar that I keep.

By the Master:

Q. When did you make the memorandum? A. When they took them away, Mr. Parkin.

432 *Cross Examination by Mr. Johnston*:

Q. On what do you base your statement that the exhibits were delivered to my firm? A. Somebody came and asked me to give them the exhibits, from that firm.

Q. You have no independent recollection of the firm to which it was delivered, that is, you made a memorandum of some kind in accordance with your duty and you rely on that for your recollection? A. That's all.

433 Q. As to defendant's exhibit No. 6, I understand that you cannot identify the exhibit which my brother has just showed you—is that exhibit No. 6? A. I cannot identify it, no sir, only by saying it was something similar or almost the same size, it may have been smaller, I doubt whether it was larger than that.

Q. Do you recollect the messenger who came for the things? A. I do not.

Re-direct Examination by Mr. Griffin:

434 Q. You say you cannot identify it, you know, however, that it consisted of a series of spirals and wires? A. Yes, I will say it looked like that to me.

Q. It looked like it—it apparently had two bars of some kind? A. I couldn't go as far as that, I don't remember every exhibit in every case.

Q. So far as you know, it looked exactly like that? A. Something like that, yes.

Q. Was it shorter or longer? A. I couldn't say, it might have been shorter, I don't believe any longer.

435 Q. But about the size of the model I show you? A. Approximately.

By the Master: Q. How do you know it was the firm of Emery, Booth, Janney & Varney? A. Whoever came said they were from the firm of Emery, Booth, Janney & Varney.

436 Mr. Johnston: I have no objection to the master as master taking judicial notice of anything that went on in his office as Clerk of the Court. Since this situation arose informally at the last hearing, I have investigated in my own office, my two messengers, A. Barry Marten and Philip Everett, both told me they have no independent recollection of taking any exhibits from the office of the Clerk here, and that they are both certain they did not
437 bring to our office any coil of wire of the character just indicated, but the months which have elapsed have been filled with similar duties on the parts of the same messengers at different times and of course their recollection is necessarily vague in such a matter as this. None of us, I believe, attached any particular importance to the physical exhibits of this character after the court was through with them and they may have been removed and destroyed, but we have no knowledge of them over in my office.

438 Mr. Griffin: I doubt whether it ever did come to your office because I got this one down in the office of the Concrete Steel Company afterwards, but in order that the record may be straight, and in view of the showing that the models were delivered to counsel for the Concrete Steel Company, I now demand the production of that model from counsel.

Mr. Johnston: As already indicated, I have exhausted my resources in searching for it and while I would gladly comply with the demand if I could, I cannot do so.

On the other hand, I shall object to the consideration of the model if found because insufficiently proved. There is no statement in the original printed record on page 16 thereof which amounts to proof of the construction.

Mr. Griffin: I will offer in evidence Turner patent No. 1,159,297, dated November 2, 1915, and will refer to it presently. 440
I ask to be sworn.

CARLOS P. GRIFFIN, being duly sworn and examined as a witness for the plaintiff, testifies as follows:

I am principal counsel in this action and as such counsel have had entire charge of all of the matters connected therewith, save such as were handled by my associates. At the time of 441
bringing the original actions against the Electric Welding Company and Concrete Steel Company, I had two models, both of which were made by the Electric Welding Company and one of which I had changed to correspond with the one I filed in the Electric Welding Company suit. That

model consisted of a spiral coil of wire secured to two spacing bars by means of prongs projecting from the margin of the bar. Both models were then substantially the same length, but one was larger in diameter than the other and were substantially identical in construction. The larger model which was actually made and finished by Electric Welding Company, I cut in two parts, one part was filed in the Electric Welding Company case at Pittsburgh and the other part was filed as plaintiff's Exhibit No. 6 in this
443 action. This second model which I now offer in evidence before the master and ask to have marked Plaintiff's Accounting Exhibit No. 5, as far as construction goes, is an exact duplicate of the construction I offered in evidence in the Electric Welding Company case, except that it has a few more spirals and is not quite so large in diameter, and that model is substantially a duplicate of the construction shown in figure 2 of the patent to C. A. P. Turner, No. 1159297, November 2, 1915, which patent has a claim covering that construction.

444 The model is marked Plaintiff's Accounting Exhibit No. 5.

Mr. Johnston: The construction shown in Plaintiff's Accounting Exhibit No. 5 differs from the patent in that the spurs on the exhibit are in the same line while those in the patent are shown staggered —does it not?

Mr. Griffin: Yes.

Mr. Johnston: Otherwise substantially identical, as I understand it.

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If the Master will rule that these two exhibits shall be available to me in defendant's proofs without further offering them in evidence on my behalf it will save a little time, and I presume my brother Griffin will make no objection.

Mr. Griffin: I offer the sketch in evidence.

It is marked Plaintiff's Accounting Exhibit No. 6.

The Master: Those exhibits will be available to you.

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Met pursuant to adjournment, at the office of the Special Master, Park Row, New York City, June 28, 1920, at 2 P. M.

Present as before.

Mr. Edwards waives notice of the taking of testimony in Pittsburgh.

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The Master: Mr. Johnston, I will give you until July 10, 1920, to get your proofs in. I will close the case on that date.

Mr. Edwards, I will give you until July 21st, to file your brief, and will give Mr. Johnston until August 1st to file his reply brief, and then Mr. Edwards can have until August 15th to reply to Mr. Johnston's brief.

(The plaintiff made no requests to find).

DEFENDANT'S REQUESTS TO FIND. 601

PRAYERS AS TO DAMAGES.

I.

The Master finds as a fact that plaintiff has not shown by any evidence in this case that it has suffered any damage from infringement of the letters-patent in suit by the defendant in this case.

II.

The Master finds as a fact that the plaintiff is 602
not engaged in the manufacture and sale of the concrete reinforcing such as is described in the letters-patent in suit, and has suffered no damages by reason of any competition of the defendant in business of the character indicated.

III.

The Master finds from all the competent and material evidence in the case, and he so reports the fact to be, that no established rate of royalty for the use of the invention described in the letters-patent in suit has been shown by the plain- 603
tiff.

IV.

The Master finds, and so reports the fact to be, that the plaintiff has not shown by any competent and material evidence in this case what would be a reasonable royalty for the use of the

invention described in the letters-patent in suit; and that the evidence on behalf of the plaintiff is in such conflict that he is unable to determine therefrom what would be a reasonable royalty for the use of the invention; and that the weight of evidence, giving due regard to the qualifications and experience of the witnesses, both on behalf of the plaintiff and on behalf of the defendant, leaves wholly undetermined the fact that any royalty whatever would have been agreed upon and paid either by this defendant or by any other
605 person in the trade for the use of the said invention described in the letters-patent in suit.

V.

The Master finds and so reports the fact to be that there were other methods in use at the time of the issue of the reissued letters patent in this case which were satisfactory to the trade and accomplished the purposes of the Vandenburgh construction described in the letters patent in suit in an efficient and workmanlike manner, and that there is no advantage provided in the Van-
606 denburgh construction over the constructions referred to; and he further finds as a fact that no reason is shown by the evidence in this case why any person or persons, including the defendant in this case, should pay any royalty whatever for the use of the Vandenburgh construction.

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VI.

The Master finds, as a conclusion of law from all the competent and material evidence in the case on the question of damages, that plaintiff is entitled to nominal damages of six cents, and no more; under the rules of law laid down by the Supreme Court of the United States in the following cases:

Garretson v. Clark, 111 U. S. 121;

608

and by the Circuit Court of Appeals for the Second Circuit in

Tuttle v. Gaylord, 28 F. R. 97;
Hohorst Case, 91 F. R. 655.

PRAYERS AS TO PROFITS.

VII.

The Master finds as fact that there were concrete reinforcements in use in the trade other than in the form shown by the plaintiff which 609
were capable of efficient use, and which were in fact so used satisfactorily; and that there is no competent and material evidence in the case showing any financial advantage to the defendant from the use of the infringing concrete reinforcements over such other concrete reinforcements. Specifically the Master finds and so reports the fact to be that the forms of concrete

610 reinforcements designated briefly as the Third Circuit forms, which were referred to by the Court of Appeals for the Third Circuit in the case of

Vandenburgh v. Electric Welding Co., 263 F. R. 95;

and particularly described by the Court of Appeals on Page 97, beginning at line 20 and ending at line 43, were practical and reliable
611 forms of concrete reinforcement and are held by that Court not to infringe the letters-patent in suit; and that there is no competent and material evidence in the case of any advantage whatever of the plaintiff's patented structure over the form of concrete reinforcing described by the Court as above noted, which said form of concrete reinforcement was open to the defendant in this case to make, use and sell.

Other forms of concrete reinforcement, particularly the types known as wired reinforcements, were stated by the plaintiff's witnesses to be outside of the patent in suit and the Master
612 finds the facts so to be; and he further finds that there is no competent and material evidence in the case of any financial advantage from the use of the construction shown in the patent in suit over such other forms of concrete reinforcement.

VIII.

The Master finds and so reports the fact to be that there is no competent and material evidence

in the case that the sale of the concrete reinforcements by the defendant was effected or affected by reason of the so-called Vandenburgh combination disclosed in the patent in suit.

Specifically the Master finds, and so reports the fact to be that the sales were merely an incidental and relatively insignificant part of the total sales of the defendant, and that such sales were made in general in connection with sales of other and more important items and as an accommodation to purchasers of larger and more important items who desired to fill all their wants 614
from a single source.

IX.

The Master finds, and so reports the fact to be, that the plaintiff has given no evidence showing any apportionment of total profit of the defendant in the sale of the ironwork referred to in their report entitled "Plaintiff's Accounting Exhibit 4" between the ordinary manufacturer's profits from the sale of ironwork, and those due to the use of the invention of the patent in suit.
615

X.

The Master finds as fact that the plaintiff has given no evidence showing that an apportionment of profits in the way indicated in Prayer IX is impossible, either by reason of expense or difficulty, and as a conclusion of law thereon he reports that the defendant was under no duty to attempt to apportion profits.

616 *Defendant's Requests to Find.*

XI.

The Master finds on all the competent and material evidence in the case that no basis for apportioning profits between sales of ironwork in general and profits due to the use of the invention of the patent in suit has been laid.

XII.

Conclusions of Law on the Subject of Profit.

617

The Master finds, as conclusion of law from the evidence, that plaintiff is not entitled to any sum by way of recovery of profits from the defendant in this case earned by it from the practice of the invention set out in the claims in suit; under the rules of law laid down by the Supreme Court of the United States in

Dobson *v.* Hartford Carpet Co.,	114 U. S. 439
Dobson *v.* Dornan,	118 U. S. 10
Mowry *v.* Whitney,	81 U. S. 620
Black *v.* Thorne,	111 U. S. 121
618 Garretson *v.* Clark,	111 U. S. 122
Coupe *v.* Royer,	155 U. S. 565
Rude *v.* Westcott,	130 U. S. 152
Spalding *v.* Mason,	161 U. S. 375

And in the Courts of this Circuit in

Tuttle *v.* Gaylord,	28 F .R. 97
Hohorst Case,	91 F. R. 655
Roemer *v.* Simon,	31 F. R. 41

XIII.

Conclusions of Fact and Law on the Whole Case.

The Master finds as conclusions of fact and law from all the competent and material evidence in the record of the whole case; that plaintiff is entitled to a decree for six cents damages, no profits, and its costs up to and including the interlocutory decree; and that defendants are entitled to the costs of the accounting; under the 620
rule of law laid down by the Supreme Court of the United States.

622

Master's Report

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL Co.,
Defendant.
Equity No. 14-88.

623

By interlocutory decree entered herein on May 15, 1919 it was referred to me to take and report to the Court an account of damages sustained by the plaintiff and of the profits received by the defendant from the infringement of claims 3 and 5 of reissued letters patent No. 14182 granted August 15, 1916 to George E. Vandenburgh.

Pursuant to said decree the parties attended before me and I have taken the account. The evidence is submitted herewith and on such evidence I report as follows:

624 The patent relates to a reinforcing bar for cement and concrete construction. The claims 3 and 5 were held not infringed by the lower Court. In the Court of Appeals, however, it was held that these claims were valid and infringed by the defendant. The claims are as follows:

3. A reinforcing bar provided upon one edge with a series of kerfs, each having an integral overlapping spur and a coil disposed in said kerfs. Each convolution thereof being retained beneath one of said spurs.

5. A reinforcing bar provided upon one edge with a series of kerfs disposed diagonally to the length of the bar. Each having an overlapping integral spur projected toward the center of the bar and a coil disposed in said kerfs and retained beneath said spurs.

The article in question consists of a cylindrical 626
helix or spiral of steel wire with one or more angle bars inside of it. These angle bars have kerfs cut in one edge in which the coils of the wire are set so as to keep the coils in position. The overlapping spur of the kerf can be forced down on the wire and hold it rigidly in place.

The patent was before the Third Circuit in *Vandenburgh* v. *Electric Welding Co.* 263 F. R. 95. The lower Court there held the patent invalid and dismissed the bill. In the Court of Appeals it was held that the claims were not infringed, the Court saying that coils and bars were old and mere attachment of the two was also 627
old; "and Vandenburgh's advance consisted, not in bar and coil attachment generally but in the kerf and spur attachment."

In the present suit the decision of the Court of Appeals is to the same effect. The Court refers to the admission of the defendant's wit-

ness Cummings that the plaintiff's form of reinforcing structure was new in cement work. Cummings says that prior to 1907 and 1908 the only knowledge he had of spirals with integral fastenings was what he obtained from books; that prior to that time contractors used wires to secure the spirals to longitudinals. In construing the claims, the Court of Appeals says: "So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a truss-like struc-
629 ture within the body of the concrete and which can be more cheaply manufactured than if the spirals were riveted or welded to the bar at each point of contact." The comparison is between spirals riveted or welded at each point of contact and those connected by kerfs and spurs.

Plaintiff in his brief says that as the articles sold consisted of the series of elements recited in the claim, all the profits were due to the invention. The language of the claim does not control the accounting for profits;—that depends upon the contribution or step in advance which the pat-
630 entee has made in the art. *Dunn Mfg. Co.* v. *Standard Computing Scale Co.*, 204 Fed. Rep. 617; *Herman* v. *Youngstown Car Mfg. Co.* 216 Fed. Rep. 604.

In this view of the case it is one falling under class (d) of the classification in *Westinghouse* v. *Wagner* 225 U. S. 604, and it was the duty of the plaintiff to apportion the profits between those due to the patented feature and those attributable

to the unpatented part, or to show that such apportionment is impossible by reason of the defendant's acts.

The plaintiff has made no effort to work out an apportionment or to show that one was difficult or impossible. According to his evidence the only other method of attachment open to the defendant at the time of the infringement was by wiring them together, and in connection with a claim for a reasonable royalty, the plaintiff has introduced estimates by experts as to the comparative cost of the two methods, showing a large 632
saving by the Vandenburgh method. But these estimates give no basis for an apportionment for the reason that it does not appear what, if any, part of this saving went to the defendant.

According to Professor Thayer, one of plaintiff's experts, when wiring is employed, the spirals and bars are shipped separate and assembled on the job;—field assembly it is called. Who pays the cost of this, whether the manufacturer or contractor is not stated. In the defendant's work where four bars are used in reinforcement as is required by most building laws, two of the bars are inserted at the shop, 633
but not rigidly attached, the coils are pressed down so as to lie flat and then shipped to the job where the coils are set up again and the other bars inserted and the spurs hammered down on the coils. The cost of the assembling done by the defendant is given in the defendant's testimony, but there is nothing to show that the defendant made any profit from saving in labor. Mr. White

another of plaintiff's experts says that he does not know who makes the profit, the manufacturer or the contractor.

So far then as making any apportionment of the profits between the patented and unpatented features is concerned, the plaintiff has wholly failed to sustain the burden of making such apportionment and it would be necessary to report that there was no evidence of the profits made by the defendant, were it not that in my opinion, the evidence shows that the whole value
635 of the defendant's structure as a commercial article lay in the patented feature and that all the profits from the sale of the article were due to it. The evidence on which this conclusion is based was not introduced specifically for the purpose of establishing this point, but as it is in the case, it is necessary to consider it.

On the trial of the case Professor Thayer said that the competition in concrete reinforcing was so great that anything which cost more money than some other method went right out of existence. Cummings, the president of the Electric Welding Company, whose patent for reinforce-
636 ment by hoops is in the record, says that hoops could not compete with spirals because of the greater expe[illegible] Bruce Clark White, one of the plaintiff's ex[illegible]s, says that at the time of the infringement t[illegible] only method of attachment open to the public was the old system of wiring. He says that he had never used the wiring system personally nor seen it used in any practical way.

There were other methods of attachment, but they were covered by patents.

Mr. White estimates the cost of attachment by wire at $40 a ton and the cost of attaching by the Vandenburgh method at $4. He is very cautious in his statement, saying that without a complete layout of column bars, pitch of spiral and other particulars which would affect the cost, it is impossible to make a close estimate. His estimate of $40 a ton is based on an assumed structure given by plaintiff's counsel which, the witness says, would be exceptional. As to another as- 638
sumed column, he gives the respective costs as $15 and $1. Professor Thayer gives the costs as $13 and $3 respectively. Both witnesses assume field assembly for the wiring system, and partial shop assembly for the Vandenburgh system.

The defendant's cost accountant, Weber, says that the actual cost of assembling the defendant's structure was $4.88 per ton. The defendant devised a system of wiring which cost only $5.52 a ton, but this was after the injunction. He thinks the estimates given by White and Thayer excessive and that the cost would be nearer $4
than $40, but on cross-examination admits that in 639
criticising White's figures he had in mind only this system devised by defendant after the injunction. The witness says this had been sold in a number of instances, but to what extent and how it compared with the infringing structure in efficiency does not appear. As it was not known at the time of the infringement and only devel-

oped later it must be disregarded as a standard of comparison. *Expanded Metal Co.* v. *General Fireproof Co.*, 247 F. R., at p. 910.

The difference in cost between the old method of wiring and the Vandenburgh method would be prohibitive to the former. No builder would buy reinforcement which required such an expensive method of attachment when there were cheaper ones to be had. Even the difference in cost of the defendant's wiring system, 74 cents a ton, might be prohibitive in large contracts.

641 The defendant says that the structure involved in the suit against the Electric Welding Company was open to it. There was some dispute as to what this structure was, the exhibit having been lost. The opinion of the Court says that the bar used in that structure was a channel bar with a tongue stamped out of the solid central back portion, which tongue was wound over the coil. Plaintiff's counsel claimed that the bar was an angle bar, and that it was covered by a patent to Turner No. 1159297. This patent, while it says that the bars are preferably of angle iron, does

642 not so limit the construction and would cover either channel or angle bars. Defendant says that under *McCreary* v. *Canal Co.*, 141 U. S. 459, patented structures are to be considered as open to the defendant.

But the case does not so hold. The Court was considering a case where an earlier patent than the one sued on was claimed to be owned by the plaintiff and excluded from defendant's use, but the opinion expressly says that a patent owned by

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a third party would present a different question. Whether or not such a patent is to be considered as open to the public depends upon whether it is held a close monopoly or its use is available at a price. *American Pneumatic Service Co.* v. *Snyder,* 241 F. R. 274. There is no evidence that the use of the patent or any of the patents for attaching spirals and bars was available to the defendant and Mr. White's statement that the only method open at the time of the infringement was the old method of wiring, stands uncontradicted.

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The case then comes within class (b) of the classification in *Westinghouse* v. *Wagner,* supra, and the line of cases of which *Wales v. Waterbury,* 101 F. R. 126, *Mfg. Co.* v. *Cowing,* 105 U. S. 258, *Crosby Valve Co.* v. *Safety Valve Co.,* 141 U. S. 441 and *Mainim* v. *Union Special Mach. Co.* 187 F. R. 123 are samples, where the patented feature gives the whole value to the structure and the patentee recovers all the profits made from its manufacture and sale.

The account brought in by the defendant on the plaintiff's motion contains a list of all the infringing spirals and bars sold by the defendant for use in reinforcing concrete. As finally amended, it showed a net profit on the total business of $1826.12. It is made up of many items on some of which there was a profit and on others a loss. According to an appendix to plaintiff's brief, which is apparently not questioned by the defendant, the profit on the profitable sales aggregated $18982.13 and the plaintiff claims to recover this amount as profits. That the profits may be

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recovered and the losses disregarded is settled. *Crosby Valve Co.* v. *Safety Co.*, 141 U. S. 441, *McKee Glass Co.* v. *H. C. Frey Co.*, 248 F. R. 125; *Canda Bros* v. *Michigan Malleable Iron Co.*, 152 F. R. 178, *Metallic Rubber Tire Co.* v. *Hartford*, 254 F. R. 860.

One objection is made by plaintiff to the account, viz., the item of interest on the investment. But it is settled for this Circuit that this is a proper credit to the defendant. *Oehring* v. *Fox Typewriter Co.*, 251 F. R. 584. The interest
647 charged is $4085.07 on sales of spirals aggregating $205591.62. The sales of spirals made at a profit amounted to $154293.35 and were 75% of the total. 75% of $4085.07 is $3063.80 which must be deducted from the profit above given, namely $18982.13. The remainder is $15918.33 and is the amount which the plaintiff is entitled to recover.

The total tonnage sold was 2411 tons and profits were made from the sale of 1684 tons of material. On the remaining 727 tons sold at a loss the plaintiff asks damages in the shape of a reasonable royalty. This he is entitled to if the
648 evidence is sufficient on which one can be computed. *McKee Glass Co.* v. *H. C. Frey Co.*, 248 F. R. 125.

Vandenburgh never made or sold any concrete reinforcement and never exploited his patent in any way. There are no damages from lost sales or reductions in price. The evidence as to the amount of a reasonable royalty is as follows: Mr. White, basing his conclusion on the difference in

labor cost between the patented method and the old method of wiring says that a royalty of $12 a ton would be fair and on the same basis Professor Thayer says $8. Fred T. Llewellyn, a witness for the defendant who is an assistant to the President of the United States Steel Corporation as engineer, and whose position and experience entitle his opinion to weight, says that royalties usually depend on the extent to which a patent has been exploited he instances $1.00 a ton for a bar for concrete reinforcement including the assistance of the patentee in marketing it. 650 He thinks the estimates of White and Thayer absurdly high, says 10% of the saving or the additional profit would be a reasonable measure of the value of the patent in view of the risk of non success assumed by the user. This is all the expert evidence on the subject.

Two licenses have been granted by the patentee. One of them, testified to by the plaintiff's counsel was for $3.00 a ton. It was to an infringer, the Concrete Steel Products Company, and was in part in settlement of past infringement. The testimony in regard to this contract 651 was given by the plaintiff on the trial and by his counsel on the accounting. The contract itself is not in evidence. It was the only license prior to the filing of the account and was subsequent to the reissue. The defendant put in evidence the other license agreement. It was made to the Corrugated Bar Co., October 3, 1919, after the decision in this Circuit sustaining the patent put before the decision in the Court of Appeals in the Third Circuit. The testimony in regard to it is

in the deposition of Albert L. Johnson the president of the licensee, taken on the accounting. The contract provides for a payment of $3,000 for past infringements and for an exclusive license in certain territory which included the greater part of the United States. A license fee of $3 a ton is to be paid, the minimum to be $125 a month to November 30th, 1921, and thereafter $300 per month. It contains a clause that if claim 3 of the reissued patent is held by any Circuit Court of Appeals to be invalid or to be insufficient to cover
653 the construction there in suit, all the obligations of the licensee shall cease and the license granted to it shall continue free and clear of all license fees and royalties. Under the decision of the Court of Appeals in the Third Circuit the obligation of the licensee to pay royalties for the use of the patent is at an end. In view of this contract it seems impossible to award any large royalty for the use of the patent.

But none of this evidence affords any basis for fixing the amount of a reasonable royalty. A reasonable royalty is the amount which one can afford to pay who desires to manufacture under
654 the patent. This is a business question and all the factors of cost and competition must be considered which would enter into the calculation of one who was about to make a contract for a license. *Consolidated Rubber Tire Co.* v. *Diamond Co.*, 226 F. R. 455; *Page Machinery Co.* v. *Dow Jones Co.*, 238 F. R. 369. In the former case it was said that the royalty "must leave room for the usual profit in the business together with the cost of production * * *." What the market will bear determines the license value or royalty.

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Reinforced concrete has gone into extensive use in construction, and there were other devices such as that involved in the Electric Welding case and a method of attachment by staples clinched to the longitudinal bar, the cost of which Professor Thayer says would be about the same as the Vanderburgh method. To what extent these were used how far they came into competition with the plaintiff's structure and what advantage the latter has or what saving or profit, over the others is not shown, except that Mr. White says he considers the Vandenburgh meth- 656
od of great utility and the most valuable and practical one. On the other hand, Mr. Llewellyn says that the trade understanding is that the sale of spirals is frequently not profitable in itself but merely serves to assist in the sale of other concrete reinforcement. He further says that $5 a ton is a very satisfactory total net profit on steel for the concrete reinforcement.

In the *Consolidated Rubber Tire* case, *supra*, a manufacturing profit of 20% was said to be not unusual and in *Bemis Car. Co.* v. *J. G. Brill Co.*, 200 F. R., 749, a manufacturing profit of 10% was approved in estimating a reasonable royalty. In 657
the present case the manufacturing cost was about $80 a ton, so that the $5 a ton profit of which Mr. Llewellyn speaks would be less than 10%, and the actual profit made by the defendants was only about 75 cents a ton. On these figures there would be no room for any royalty at all.

I report that there is no evidence before me on which a reasonable royalty can be calculated.

658 The question whether the defendant's infringement was deliberate has been argued, and although the question is not involved if there are no damages the facts may be stated.

It is a stipulated fact that nobody connected with the defendant company ever saw a device of the character in suit which was built by plaintiff or by anybody associated with plaintiff; that the devices manufactured and sold by defendant, were designed independently by defendant and were not copied from anybody. It is further
659 stipulated that defendant had no knowledge of plaintiff's alleged invention or of plaintiff's original patent until the same was brought to its attention by a letter dated May 17, 1916, signed by C. P. Griffin, plaintiff's attorney.

This stipulation is in the record before the Court. From this stipulation it further appears that defendant immediately obtained a copy of the patent, examined it, wrote to its own attorneys that it did not think its structure was covered by the patent and suggested that they so write to Mr. Griffin; that the attorneys confirmed defendant's view, so wrote Mr. Griffin and de-
660 fendant continued to manufacture in the belief that it was free to do so.

On June 12, 1916 the defendant received a circular from Mr. Griffin showing a structure which defendant did not think was in accordance with the patent, but heard nothing from him until January, 1917, though in the meantime it heard of threats to other manufacturers. On January 3, 1917, it received a letter threatening suit if a settlement were not effected. The bill was filed

thereafter and proceeded through the Court of Appeals where the decision was rendered on April 16, 1919. The first account was filed on July 29, 1919.

The defendant without knowing of plaintiff's patent, in entire good faith devised a structure which unfortunately for it has been found to infringe. That it was a debatable question is shown by the decisions of the two lower courts in its favor. The defendant has shown in the proceedings before me no disposition to cause unreasonable delay or in any way harass or impede the 662
plaintiff.

In my opinion there is nothing on which to base a claim of wanton infringement. *Brown Bag Filling Mach. Co.* v. *Drohen*, 175 F. R. 576.

Respectfully submitted,

WM. PARKIN,
Master.

664

Plaintiff's Exceptions to the Master's Report

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	Equity No. 14-88.

665

Now comes the plaintiff, George E. Vandenburgh, by his attorneys, Carlos P. Griffin and O. Ellery Edwards, and excepts to the report of the Master upon the ground herein set forth.

1. The report should find and set a reasonable royalty from the testimony adduced.

2. The report is erroneous in stating that none of the evidence affords any basis for fixing a rea-
666 sonable royalty.

3. The report is erroneous in not finding that the spirals sold by defendant were sold to assist its other steel business and that the losses should not be applied solely to spirals.

4. That the report is erroneous in not finding that a reasonable royalty is not less than seventy-four (74) cents per ton and should find a royalty not less than the license royalty of three ($3.00) dollars per ton.

5. That the report failed to find that the defendant should pay the cost of this reference.

6. That the amended report errs in that it allows the sum of Three thousand sixty-three dollars and eighty cents ($3063.80) interest on the 668
investment to be credited to the defendant when no such interest should be allowed to the defendant and no such interest should be credited.

7. That the amended report is erroneous in not finding that the plaintiff is entitled to recover interest at six per cent as to each item of profit in the statement of account filed by the defendant and in evidence as Plaintiff's Exhibit 3, because each such item is admitted by the defendant, is liquidated as to amount and definite as to date, and so as to each such item of profit interest should be allowed from the said date 669
admitted by the defendant on the said amount until payment is made.

8. That the amended report is erroneous in not finding that the plaintiff is entitled to recover interest at six per cent on the total amount of profit made by the defendant and admitted in Exhibit 3 from the date of filing said statement

670 *Plaintiff's Exceptions to the Master's Report.*

of account by the defendant as said amount due was then and there admitted by the defendant as a liquidated amount as of such date.

9. That the amended report is erroneous because the Master accepted the defendant's method of calculating interest on the investment, whereas this method was wrong for the following reasons, to wit:

671 1st. No showing was made by the defendant as to what capital was invested in producing non-infringing devices and what capital was invested in producing infringing devices.

2nd. There was no evidence to show that the infringing devices were produced by the same machinery, apparatus or other device that produced the non-infringing devices.

672 3rd. That no witness was called to show what non-infringing devices were made by the defendant during the time covered by the accounting and what machinery was used in producing such devices and whether or not it was the same machinery that was used in producing the infringing devices, so that it is impossible to determine from the record what part of the plant and equipment produced infringing devices and what part produced non-infringing devices, or to draw

any accurate conclusion of any kind whatsoever as to this matter.

4th. There was nothing to show how the capital and surplus was used in the business of defendant and what part of it was used in producing infringing devices and what part of it was used in producing non-infringing devices.

5th. That the method of averaging the aggregate capital and surplus employed in the 674
business of the defendant during the period of the accounting is an erroneous method because it is not shown that capital and surplus were actually employed in the business.

6th. That as in the present case the defendant's plant and real estate were used for several other and wholly different kinds of manufacture than the patented article and the evidence offered to distinguish between the profits derived from the use of the plant and real estate for making the patented article and those attributable to the other 675
sources of profit was not sufficient to enable the Master to make a satisfactory apportionment or allowance for interest on the investment.

7th. That as there were infringing and non-infringing operations conducted by the

676 *Plaintiff's Exceptions to the Master's Report.*

defendant and as there has been no evidence to show the extent to which it was actually employed in the infringing operations, there is no basis for the allowance of interest which may be deducted from the profits due to the infringing operations of the defendant.

8th. That the ratio between the total sales of the defendant to the infringing sales is not shown to be the ratio of the average
677 capital employed in the total business to the capital employed in the infringing operations, and therefore the ratio as to interest is erroneous for this reason.

CARLOS P. GRIFFIN,
O. ELLERY EDWARDS,
Solicitors for Plaintiff.

Dated, New York, November 27th, 1920.

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Defendant's Exceptions to the Final Report of the Master

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
v.
CONCRETE STEEL COMPANY,
Defendant.

680

COMES Now the defendant, CONCRETE STEEL COMPANY, and excepts to the final report of William Parkin, Esq., Master in the following particulars:

1. To any award of profits in view of the Master's holding, page 4, that

> "It was the duty of the plaintiff to apportion the profits between those due to the patented feature and those attributable to the unpatented part, or to show that such apportionment is impossible by reason of the defendant's acts.
>
> The plaintiff has made no effort to work out an apportionment or to show that one was difficult or impossible."

681

682 *Defendant's Exceptions to the Final Report of the Master.*

and

> "These estimates (of plaintiff) give no basis for an apportionment for the reason that it does not appear what if any part of this saving went to the defendant."

And in view of his further finding, page 5, that

683 > "The spirals and bars are shipped separate and assembled on the job;—field assembly it is called. Who pays the cost of this, whether the manufacturer or contractor, is not stated. * * * There is nothing to show that the defendant made any profit from saving in labor."

and

> "The plaintiff has wholly failed to sustain the burden of making such an apportionment."

684 II. To the Master's finding that (page 6)

> "The evidence shows that the whole value of the defendant's structure as a commercial article lay in the patented feature and that all the profits from the sale of the article were due to it."

there being no evidence that any sale whatever, either by this defendant or by any other person, firm or corporation within the United States

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was effected or affected by reason of the patented combination; or that such patented combination was known to any purchaser whatever and considered by him or it as a reason for making the purchase or refraining therefrom.

III. To the Master's finding that

> "The difference in cost between the old method of wiring and the Vandenburgh method would be prohibitive." 686

as without evidence to sustain it because the same is restricted to a single method of attachment and based upon evidence of so-called experts founded upon estimates and without evidence of any actual costs incurred commercially; and in view of the Master's statement, page 13, that

> "There were other devices such as that involved in the Electric Welding case and a method of attachment by staples clinched to the longitudinal bar, the cost of 687 which Professor Thayer says would be about the same as the Vandenburgh method. To what extent these were used, how far they came into competition with the plaintiff's structure and what advantage the latter has or what saving or profit, over the others is not shown;"

688 *Defendant's Exceptions to the Final Report of the Master.*

the burden of proof as to these matters being upon the plaintiff and failure to show them being a bar to any recovery whatever.

IV. To the Master's holding, page 6, in effect that

> "only unpatented methods of attachment could be used as standards of comparison"

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in view of the references cited in the answer proved in the trial of the case.

V. To the Master's failure to allow the entire interest upon capital invested as an offset to any profits found to have accrued, there being no authority in law for an apportionment of said interest.

VI. To the Master's failure especially to find the conclusion of fact, set out in prayer
690 No. I of the defendant submitted to him before the filing of his report as follows:

> "The Master finds as a fact that plaintiff has not shown by any evidence in this case that it has suffered any damage from infringement of the letters-patent in suit by the defendant in this case."

VII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No.

Defendant's Exceptions to the Final Report of the Master. 691

II of the defendant submitted to him before the filing of his report, as follows:

> "The Master finds as a fact that the plaintiff is not engaged in the manufacture and sale of the concrete reinforcing such as is described in the letters patent in suit and has suffered no damages by reason of any competition of the defendant in business of the character indicated." 692

VIII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. III of the defendant submitted to him before the filing of his report, as follows:

> "The Master finds from all the competent and material evidence in the case, and he so reports the fact to be, that no established rate of royalty for the use of the invention described in the letters patent in suit has been shown by the plaintiff." 693

IX. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. IV of the defendant submitted to him before the filing of his report, as follows:

> "The Master finds and so reports the fact to be that the plaintiff has not shown by any competent and material evidence

694 *Defendant's Exceptions to the Final Report of the Master.*

in this case what would be a reasonable royalty for the use of the invention described in the letters patent in suit; and that the evidence on behalf of the plaintiff is in such conflict that he is unable to determine therefrom what would be a reasonable royalty for the use of the invention; and that the weight of evidence, giving due regard to the qualifications and experience of the witnesses, both on
695 behalf of the plaintiff and on behalf of the defendant, leaves wholly undetermined the fact that any royalty whatever would have been agreed upon and paid either by this defendant or by any other person in the trade for the use of the said invention described in the letters patent in suit."

X. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. V of the defendant submitted to him before the
696 filing of his report, as follows:

"The Master finds and so reports the fact to be that there were other methods in use at the time of the issue of the reissued letters patent in this case which were satisfactory to the trade and accomplished the purposes of the Vandenburgh construction described in the letters patent in suit in an efficient and work-

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manlike manner, and that there is no advantage provided in the Vandenburgh construction over the constructions referred to; and he further finds as a fact that no reason is shown by the evidence in this case why any person or persons, including the defendant in this case, should pay any royalty whatever for the use of the Vandenburgh construction."

698

XI. To the Master's failure specifically to find the conclusion of law, set out in prayer No. VI of the defendant submitted to him before the filing of his report, as follows:

"The Master finds, as a conclusion of law from all the competent and material evidence in the case on the question of damages, that plaintiff is entitled to nominal damages of six cents, and no more; under the rules of law laid down by the Supreme Court of the United States in the following cases:

699

Garretson v. *Clark*, 111 U. S., 121,

and by the Circuit Court of Appeals for the Second Circuit in

Tuttle v. *Gaylord*, 28 F. R., 97;
Hohorst Case, 91 F. R., 655."

700 *Defendant's Exceptions to the Final Report of the Master.*

XII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. VII of the defendant submitted to him before the filing of his report, as follows:

"The Master finds as fact that there were concrete reinforcements in use in the trade other than in the form shown by the plaintiff which were capable of efficient use and which were in fact so used satis-

701 factorily; and that there is no competent and material evidence in the case showing any financial advantage to the defendant from the use of the infringing concrete reinforcements over such other concrete reinforcements. Specifically the Master finds and so reports the fact to be that the forms of concrete reinforcements designated briefly as the Third Circuit forms, which were referred to by the Court of Appeals for the Third Circuit in the case of

702 *Vandenburgh* v. *Electric Welding Co.*, 263 F. R., 95.

and particularly described by the Court of Appeals on Page 97 beginning at line 20 and ending at line 43 were practical and reliable forms of concrete reinforcement and are held by the Court not to infringe the letters patent in suit, and that there is no competent and material evidence in the

703

case of any advantage whatever of the plaintiff's patented structure over the form of concrete reinforcing described by the Court as above noted, which said form of concrete reinforcement was open to the defendant in this case to make, use and sell.

Other forms of concrete reinforcement, particularly the types known as wired reinforcements, were stated by the plaintiff's witnesses to be outside of the patent 704 in suit and the Master finds the fact so to be; and he further finds that there is no competent and material evidence in the case of any financial advantage from the use of the construction shown in the patent in suit over such other forms of concrete reinforcement."

XIII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. VIII of the defendant submitted to him before the filing of his report, as follows:

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"The Master finds and so reports the fact to be that there is no competent and material evidence in the case that the sale of the concrete reinforcements by the defendant was effected or affected by reason of the so-called Vandenburgh combination disclosed in the patent in suit.

Specifically the Master finds and so reports the fact that the sales were merely

706 *Defendant's Exceptions to the Final Report of the Master.*

an incidental and relatively insignificant part of the total sales of the defendant, and that such sales were made in general in connection with sales of other and more important items and as an accommodation to purchasers of larger and more important items who desired to fill all their wants from a single source."

707 XIV. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. IX of the defendant submitted to him before the filing of his report, as follows:

"The Master finds and so reports the fact to be that the plaintiff has given no evidence showing any apportionment of total profit of the defendant in the sale of the iron work referred to in their report entitled 'Plaintiff's Accounting Exhibit 4' between the ordinary manufacturer's profit from the sale of iron work,
708 and those due to the use of the invention of the patent in suit."

XV. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. X of the defendant submitted to him before the filing of his report, as follows:

"The Master finds as fact that the plaintiff has given no evidence showing that an apportionment of profits in the way indi-

709

cated in Prayer IX, is impossible either by reason of expense or difficulty, and as a conclusion of law thereon he reports that the defendant was under no duty to attempt to apportion profits."

XVI. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. XI of the defendant submitted to him before the filing of his report, as follows:

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"The Master finds on all the competent and material evidence in the case that no basis for apportioning profits between sales of iron work in general and profits due to the use of the invention of the patent in suit has been laid."

XVII. To the Master's failure specifically to find the conclusion of law, set out in prayer No. XII of the defendant, submitted to him before the filing of his report, as follows:

711

"The Master finds, as conclusion of law from the evidence, that plaintiff is not entitled to any sum by way of recovery of profits from the defendant in this case earned by it from the practice of the invention set out in the claims in suit; under the rules of law laid down by the Supreme Court of the United States in

Dobson v. *Hartford Carpet Co.*, 114 U. S. 439;

Dobson v. *Dornan,* 118 U. S. 10;
Mowry v. *Whitney,* 81 U. S. 620;
Black v. *Thorne,* 111 U. S. 121;
Garretson v. *Clark,* 111 U. S. 122;
Coupe v. *Royer,* 155 U. S. 565;
Rude v. *Westcott,* 130 U. S. 152;
Spaulding v. *Mason,* 161 U. S. 375;

And in the Courts of this Circuit in
Tuttle v. *Gaylord,* 28 F. R. 97;
713 *Hohorst Case,* 91 F. R. 655;
Roemer v. *Simon,* 31 F. R. 41."

XVIII. To the Master's failure specifically to find the conclusion of fact and law, set out in prayer No. XIII of the defendant submitted to him before the filing of his report, as follows:

"The Master finds as conclusion of fact and law from all the competent and material evidence in the record of the whole case; that plaintiff is entitled to a decree of six
714 cents damages, no profits, and its costs up to and including the interlocutory decree; and that defendants are entitled to the costs of the accounting; under the rule of law laid down by the Supreme Court of the United States."

CONCRETE STEEL COMPANY,

By EMERY, VARNEY, BLAIR & HOGUET,
Solicitors and of Counsel.

715

Opinion, Knox, D. J.

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
against
CONCRETE STEEL COMPANY,
Defendant.
} E 14-88.

716

CARLOS P. GRIFFIN (O. ELLERY EDWARDS, of Counsel), for Plaintiffs;

EMERY, VARNEY, BLAIR & HOUGUET (THOMAS J. JOHNSTON, of Counsel), for Defendant.

KNOX, D. J.: Upon the accounting heretofore ordered, the Master has found plaintiff entitled to recover from defendant, by way of profits, the sum of $15,918.33. Each of the litigants has filed exceptions to the Master's report, and thus the matter comes before this Court.

717

Inasmuch as defendant contends that plaintiff should receive only a nominal award of six cents, I will first deal with the exceptions directed to that proposition.

718 *Opinion, Knox, D. J.*

The claims of the patent, held by the Circuit Court of Appeals to be valid and infringed, are:

> 3. A reinforcing bar, provided upon one edge with a series of kerfs, each having an integral overlapping spur and a coil disposed on said kerfs, each convolution thereof being retained beneath one of the spurs.
>
> 5. A reinforcing bar provided upon one edge with a series of kerfs disposed diagon-
719 ally to the length of the bar, each having an overlapping integral spur projected toward the center of the bar and a coil disposed in said kerfs and retained beneath said spurs.

That decision and one of the Court of Appeals of the Third Circuit have given the valid claims of the patent a rather narrow construction. In the latter case, reported in 263 Fed., 95, the Court said, " * * * Vandenburgh's patent" (for a reinforcing bar for use in concrete work) "made no impress in the art, and we give the patentee
720 the full measure of his disclosure and the protection of his claim by limiting his field of monopoly to a reinforcing bar with a kerf and an integral overlapping spur, as embodied in his third claim".

As construed by the Appellate Court of this Circuit, April 16, 1919, 258 Fed., 143, " * * * the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the

body of the concrete, resisting lateral and longitudinal strains, and which can be more cheaply manufactured than if the spirals were riveted or welded to the bar at each point of contact". Prior to 1907 or 1908, spirals or hoops for concrete work were attached to reinforcing bars by lapping to the bars, with wire, the convolutions of the spiral. This method of attachment was more or less laborious and expensive and not altogether satisfactory. There was, for example, evidence tending to prove that the latter method of procedure did not give an absolutely rigid attachment 722
of the spiral to the bar, or prevent the endwise slipping of the spiral thereon. Such method was also said to make it difficult to accurately space the spirals to get the best effect, and to have been a slow and expensive method of assembling, either in the shop or in the field. One witness testified that the cost of such attachment would be $40 per ton, whilst the cost by the patentee's disclosure would be but $4.00 per ton. This estimated cost, it is fair to say, was based upon an assumed column of unusual height; and, upon another assumed column, the cost was estimated in the ratio 723
of $15 to $1.00. Another of plaintiff's witnesses estimated the costs as $13 and $3. Defendant offered convincing proof that the actual cost of assembly of the infringing article, and in the manner in which its production thereof was ordinarily handled was $4.88. He was, however, unable to give figures as to the cost of assembling coils or hoops and bars under the older process of attachment. After the order of restraint here-

in had issued defendant, through the ingenuity of necessity, succeeded in doing the required wiring at a cost of $5.62 per ton. The Master, upon this latter testimony, took the position that the last-mentioned figure might not be used as a basis of computation for the reason that it came into existence after injunction. So, too, the Master held that the device which, in the *Electric Welding Co. case, supra,* was held not to infringe plaintiff's patent was not open to defendant.

725 This latter construction, I understand, consists of a channel bar, and there is no cut of any kind in the end or edge of either of the channel sides; attachment being made by using the back body of the central bar of the channel and stamping a tongue out of said solid central back portion, and then winding such tongue over the coil, which does not rest in the body of the bar, but outside of it.

It is defendant's contention that this patent was open to it because of the fact that plaintiff's patent is to be considered as of its date of reissue, to wit, August 15, 1916. Objection is,
726 therefore, made that the Master imposed upon defendant, rather than upon plaintiff, the burden of showing that the Electric Welding device, and any others that might exist, were available to defendant. The Master said:

> "To what extent these" (other structures) "were used, how far they came into competition with the plaintiff's structure, and what

advantage the latter has or what savings or profits over the others is not shown."

Prior, however, to the defendant's failure to introduce such proof, the plaintiff had shown that defendant, upon the manufacture and sale of the infringing structure, had made a profit of more than $15,000. When such proof was made it developed upon defendant, if it wished to limit its liability, "to disprove plaintiff's case, or to offer evidence in mitigation, or both." *Westinghouse Co,* v. *Wagner Mfg. Co.,* 225 U. S. 616. Plaintiff's *prima facie case,* assuming the structure to be unitary in nature, was complete, and the burden of producing evidence to disprove that case shifted to defendant. *Cowen Co.* v. *Houck Mfg. Co.,* 249 Fed. 285. 728

As the proof stands, and as was said by the Master, "the only method open at the time of infringement was the method of wiring it."

Upon an analysis of evidence much more extensive than I have indicated, the Master concluded this case to be within Class b of the classification set up in *Westinghouse* v. *Wagner Mfg. Co., supra,* to wit, "Where a patent, though using old elements, gives the entire value to the combination, the plaintiff is entitled to recover all the profits." 729

The Master, however, in the course of his opinion, remarked that the evidence upon which this conclusion was based was not specifically introduced for the purpose of establishing the point

730 *Opinion, Knox, D. J.*

made; and indeed, that plaintiff made no effort to apportion profits as between the patented and unpatented features of the structure. From this defendant argues that improper consideration was given such evidence as went into the case.

There was, upon the introduction of such evidence, no limitation or qualification as to the purpose for which it should be used; and evidence competent for one purpose may also be competent for another, and, being sufficient, may rule the decision. If this be true, it was not improper to
731 apply such evidence to any issue as to which it had probative force, and the Master found such evidence sufficient to establish that an apportionment was impossible.

As I understand the case of *Waldron* v. *Waldron*, 156 U. S. 361, it had to do with the application of certain evidence which, while competent for a limited purpose, was grossly incompetent as bearing upon another issue involved, and thus, I think, in the present instance, is not authoritative.

Defendant further says that there was no evi-
732 dence that any sale whatever, either by this defendant or by any other person, firm or corporation within the United States, was effected or affected by reason of the patented combination; or that such patented combination was known to any purchaser whatever and considered by him or it as a reason for making the purchase or refraining therefrom.

733

It does appear that defendant sold a large quantity of the infringing structures, that it was much cheaper, more satisfactory than any such built by any other method then employed; from this it may fairly be inferred that the demand therefor primarily rested upon that combination of elements upon which Vandenburgh received his patent.

From what has been said I feel justified in overruling defendant's exceptions I, II, III and IV, and I accordingly do so. Exceptions VI, VII, IX, X, XI, XII, XIII, XIV, XV, XVI, 734
XVII, XVIII relate to specific findings of fact or of law which the Master either failed to find, or which he declined to find in the form suggested. Each of said exceptions is overruled, it being my opinion either that the findings requested are not warranted, or where warranted, have been sufficiently found. If, however, defendant considers it to be of advantage to it upon appeal I will specifically find the fact embodied in Exception No. VIII.

Exception V of defendant's bill remains for consideration. It is

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> The failure to allow the entire interest upon capital invested at an offset to any profits found to have accrued, there being no authority in law for a apportionment of said interest.

I think there is no merit in this exception. If, in a case of this character, profits may be re-

covered and losses disregarded (and as to this there appears to be no doubt), it would seem that interest on such part of defendant's investment as is chargeable to the manufacture and sale of the infringing structures upon which losses occurred, should be looked upon as increasing, rather than as diminishing, defendant's loss. For this reason I overrule defendant's fifth exception.

Thus I come to the exceptions filed by plaintiff.

737 One of these is that the Master erred in making defendant any allowance of interest on its investment.

Complaint is made (1) that the principle is untenable, and (2) that inasmuch as defendant's factory produced bars and spirals as well as angles which were combined, there should be more definite proof as to what part of defendant's capital was devoted to the manufacture of the infringing article.

As to the first branch of this exception it is enough to call attention to the fact that the question of the propriety of such allowance, once the

738 amount of capital devoted to such manufacture is ascertained, is no longer open in this district. *Oehring et al.* v. *Fox Typewriter Co.*, 251 Fed., 584.

As to the alleged insufficiency of the proof upon this subject, I am satisfied that the method pursued in arriving at that portion of the investment devoted to the manufacture of spirals brings about a result as accurate and complete as it is reasonably possible to secure. When a factory

is devoted, as was defendant's, to the manufacture of a number of products it is impossible, save by a system of averages, to arrive at anything approaching accuracy. It is said that here there was no direct proof of the amount of capital devoted to manufacturing spirals, and that such proof is available. With this I do not agree. Suppose that the machines and all the other elements entering into a proper calculation of investment devoted to such manufacture were all definitely set forth,—the original cost thereof could not for long be taken as a basis of computation. The incidents 740
of depreciation, replacements and the like would quickly become factors to be taken into account; and once this had come to pass one would be relegated to the use of estimates, appraisals and opinions which, dependent upon the knowledge, skill and interest of the persons giving them, would be contradictory and widely divergent. In the case at bar defendant kept a detailed and complete account of its costs, charges, expenses, overhead and general investment. It was kept without reference to the present litigation and with the sole purpose of having at hand for its own use, convenience and information, the state of 741
its business. There can be no doubt that the account was honestly kept; and I am of the opinion that there was before the Master evidence from which he could, and did, satisfactorily apportion the interest between the several kinds of business. *Seabury* v. *Am Ende*, 152 U. S. 561. As to plain-

tiff's argument that the case of *Rubber* v. *Goodyear*, 9 Wall, 788, 804, renders impossible the allowance of interest here made, I can do no better than call attention to what was said in *Western Glass Co.* v. *Schmertz Wire Glass Co.* 226 Fed. 738, with reference to the Goodyear decision and others in the Supreme Court bearing upon the present subject.

Plaintiff's first, second and fourth exceptions relate to the Master's failure to find a reasonable royalty for the use of plaintiff's structure.
743 Upon evidence which was satisfactory to the Master, and which, in my judgment, supports his conclusions, he has, upon this feature of the case, found against the plaintiff. His reasons therefor are, to my mind, so sound and convincing as to make unnecessary a further discussion of the subject.

The third exception is, that there should have been a finding that spirals sold by defendant were for the purpose of assisting its other business, and that the losses should not be applied solely to spirals. I think this is not a good ob-
744 jection. If the exception were to be allowed, it would only be proper that, as to the profits, defendant should receive a credit to the extent that such profits were contributed to by defendant's other business.

Exception Seven, dealing with plaintiff's claim that it is entitled to recover interest as to each item of profit as of the date the same was realized, is overruled upon the authority of *Oehring*

v. *Fox Typewriter Co., supra,* and the cases therein cited. By virtue of the same authority, interest will be allowed to plaintiff from the date of the Master's report, and the defendant will likewise be held for the cost of the reference. By what has just been said, plaintiff's exceptions Five and Eight are disposed of.

I think that I have, in substance, covered the exceptions filed by each of the parties to the report of the Master. If perchance, I have not specifically discussed any exceptions it is not by reason of my failure to consider the same, but 746
because of the fact that I concur with the Master therein. A decree in conformity herewith may be submitted.

April 21, 1921.

JOHN C. KNOX,
U. S. District Judge.

748

Final Decree

At a stated term of the United States District Court, held in and for the Southern District of New York, at the Federal Building, New York City, this 28th day of April, 1921.

Present: Hon. John C. Knox.
United States District Judge.
Holding the Court.

749

George E. Vandenburgh,
Plaintiff,
against
Concrete Steel Company,
Defendant.

Equity
14-88.

This cause came on to be heard at this term and was argued by counsel, and thereupon, upon consideration thereof, it was

Ordered, Adjudged and Decreed as follows:

750

1. That each and all exceptions of the plaintiff be, and hereby are, overruled.

2. That each and all exceptions, save Exception No. VIII, of the defendant, be overruled.

3. That defendant's exception No. VIII is sustained.

4. That the Master's report be, and hereby is, in all other respects affirmed.

5. That the plaintiff recover no damages.

6. That the plaintiff recover profits in the sum of $15,918.33 with interest from the date of the Master's report, to wit November 15th, 1920. 752

7. That the defendant be taxed $500 for the Master's fee and $150.85 for his stenographer's fee.

8. That the plaintiff recover from the defendant his costs to be taxed, including the cost of all stenographer's minutes paid by him, both in Court and before the Master, and also his costs in the Circuit Court of Appeals in the sum of $78.48.

Signed, Jno. C. Knox,
U. S. D. J. 753

Approved as to form
Counsel for Plaintiff.

Emery, Booth, Janney & Varney,
Counsel for Defendant.

754

Plaintiff's Petition for Appeal

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff,

vs.

CONCRETE STEEL COMPANY,
Defendant.

755

The above named plaintiff, George E. Vandenburgh, considering himself aggrieved by a final decree made and entered herein on the 28th day of April, 1921, hereby petitions this Court for an order allowing him to prosecute an appeal from said decree to the United States Circuit Court of Appeals for the Second Circuit, for the reasons specified in an assignment of errors filed herewith; and prays that citation issued as provided by law.

756

O. ELLERY EDWARDS,
Solicitor for Plaintiff.

Dated, New York, June 7, 1921.

757

Order Allowing Appeal

At a Special Term of the District Court of the United States for the Southern District of New York held in the Post Office Building in the Borough of Manhattan of the City of New York on the 8th day of June, 1921.

Present: Hon. John C. Knox,
United States District Judge,
Holding the Court. 758

George E. Vandenburgh,
Plaintiff,
vs.
Concrete Steel Company,
Defendant.

George E. Vandenburgh, the above named plaintiff, having presented and filed a petition for an order allowing an appeal to the United States Circuit Court of Appeals for the Second Circuit from a final decree made and entered 759 herein on the 28th day of April, 1921, and having filed his assignment of errors with said petition, now, upon motion of O. Ellery Edwards, Esq., Solicitor for the plaintiff it is hereby

760 *Order Allowing Appeal*

ORDERED that an appeal to the United States Circuit Court of Appeals for the Second Circuit from the final decree made and entered herein on the 28th day of April, 1921, be, and the same hereby is allowed, and it is further,

ORDERED that an appeal bond in favor of the defendant in the usual form and in the sum of two hundred and fifty dollars ($250) be filed by the plaintiff in this court and be approved by the same and that this appeal be effective when such bond be furnished.

761

JOHN C. KNOX,
U. S. D. J.

Dated, New York, June 8, 1921.

763

Assignment of Errors

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH, Plaintiff, vs. CONCRETE STEEL COMPANY, Defendant.	In Equity No. 14-88.

764

Now comes GEORGE E. VANDENBURGH, plaintiff in the above entitled case, in which a final decree was made and entered on the 28th day of April, 1921 and says that said decree is erroneous and against the just rights of the plaintiff in the following particulars:

FIRST: The District Court erred in overruling the plaintiff's exception No. 1 to the final report of the Master as follows:

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1. The report should find and set a reasonable royalty from the testimony adduced.

SECOND: The District Court erred in overruling the plaintiff's exception No. 2 to the final report of the Master as follows:

766 *Assignment of Errors*

2. The report is erroneous in stating that none of the evidence affords any basis for fixing a reasonable royalty.

THIRD: The District Court erred in overruling the plaintiff's exception No. 3 to the final report of the Master as follows:

3. The report is erroneous in not finding that the spirals sold by defendant were sold to assist its other steel busi-
767 ness and that the losses should not be applied solely to spirals.

FOURTH: The District Court erred in overruling the plaintiff's exception No. 4 to the final report of the Master as follows:

4. That the report is erroneous in not finding that a reasonable royalty is not less than seventy-four (74) cents per ton and should find a royalty not less than the license royalty of three ($3.00) dollars per ton.

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FIFTH: The District Court erred in overruling the plaintiff's exception No. 5 to the final report of the Master as follows:

5. That the report failed to find that the defendant should pay the cost of this reference.

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SIXTH: The District Court erred in overruling the plaintiff's exception No. 6 to the final report of the Master as follows:

> 6. That the amended report errs in that it allows the sum of Three thousand sixty-three dollars and eighty cents ($3063.80) interest on the investment to be credited to the defendant when no such interest should be allowed to the defendant and no such interest should be credited.

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SEVENTH: The District Court erred in overruling the plaintiff's exception No. 7 to the final report of the Master as follows:

> 7. That the amended report is erroneous in not finding that the plaintiff is entitled to recover interest at six per cent as to each item of profit in the statement of account filed by the defendant and in evidence as plaintiff's Exhibit 3, because each such item is admitted by the defendant, is liquidated as to amount and definite as to date, and so as to each such item of profit interest should be allowed from the said date admitted by the defendant on the said amount until payment is made.

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EIGHTH: The District Court erred in overruling the plaintiff's exception No. 8 to the final report of the Master as follows:

8. That the amended report is erroneous in not finding that the plaintiff is entitled to recover interest at six per cent on the total amount of profit made by the defendant and admitted in Exhibit 3 from the date of filing said statement of account by the defendant due was then and there admitted by the defendant as a liquidated amount as of such date.

773 NINTH: The District Court erred in overruling the plaintiff's exception No. 9 to the final report of the Master as follows:

9. That the amended report is erroneous because the Master accepted the defendant's method of calculating interest on the investment, whereas this method was wrong for the following reasons, to wit:

1st. No showing was made by the defendant as to what capital was invested in producing non-infringing devices and what
774 capital was invested in producing infringing devices.

2nd. There was no evidence to show that the infringing devices were produced by the same machinery, apparatus or other device that produced the non-infringing devices.

3rd. That no witness was called to show what non-infringing devices were made by the defendant during the time covered by the accounting and what machinery was used in producing such devices and whether or not it was the same machinery that was used in producing the infringing devices, so that it is impossible to determine from the record what part of the plant and equipment produced infringing devices and what part produced non-infringing devices, or to draw any accurate conclusion of any kind whatsoever as to this matter. 776

4th. There was nothing to show how the capital and surplus was used in the business of the defendant and what part of it was used in producing infringing devices and what part of it was used in producing non-infringing devices.

5th. That the method of averaging the aggregate capital and surplus employed in the business of the defendant during the period of the accounting is an erroneous method because it is not shown that capital and surplus were actually employed in the business. 777

6th. That as in the present case the defendant's plant and real estate were used for several other and wholly different

778 *Assignment of Errors*

kinds of manufacture than the patented article and the evidence offered to distinguish between the profits derived from the use of the plant and real estate for making the patented article and those attributable to the other sources of profit was not sufficient to enable the Master to make a satisfactory apportionment or allowance for interest on the investment.

779 7th. That as there were infringing and non-infringing operations conducted by the defendant and as there has been no evidence to show the extent to which it was actually employed in the infringing operations, there is no basis for the allowance of interest which may be deducted from the profits due to the infringing operations of the defendant.

780 8th. That the ratio between the total sales of the defendant to the infringing sales is not shown to be the ratio of the average capital employed in the total business to the capital employed in the infringing operations, and therefore the ratio as to interest is erroneous for this reason.

GEORGE E. VANDENBURGH,
By O. ELLERY EDWARDS,
Solicitor for Plaintiff.

261

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Citation

UNITED STATES CIRCUIT COURT OF APPEALS

FOR THE SECOND CIRCUIT

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant. 782

BY THE HONORABLE JOHN C. KNOX,
One of the Judges of the DISTRICT COURT OF THE UNITED STATES for the SOUTHERN DISTRICT OF NEW YORK, in the SECOND CIRCUIT.

To CONCRETE STEEL COMPANY

GREETING:

YOU ARE HEREBY CITED and admonished to be and appear before a UNITED STATES CIRCUIT 783
COURT OF APPEALS for the Second Circuit, to be holden at the Borough of Manhattan in the City of New York, in the District and Circuit above named, on the day of July, 1921, pursuant to an appeal filed in the Clerk's Office of the

District Court of the United States for the Southern District of New York, wherein George E. Vandenburgh is the appellant and you are the appellee, to show cause, if any there be, why the decree in said appeal mentioned should not be corrected and speedy justice should not be done in that behalf.

GIVEN UNDER MY HAND at the Borough of Manhattan, in the City of New York, in the District and Circuit above named, this 8th
785 day of June, in the year of our Lord One Thousand Nine Hundred and Twenty-one, and of the Independence of the United States the One Hundred and Forty-fifth.

JNO C. KNOX,
Judge of the District Court of the United States for the Southern District of New York.

787

Defendant's Petition for Appeal

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant.

Equity
No. 14-88.

788

The above named defendant, Concrete Steel Company, considering itself aggrieved by a final decree made and entered herein on the 28th day of April, 1921, hereby petitions this Court for an order allowing it to prosecute an appeal from said decree to the United States Circuit Court of Appeals for the Second Circuit, for the reasons specified in an assignment of errors filed herewith; and prays that citation issue as provided by law.

And your petitioner further prays that an order be made fixing the amount of security which 789
the defendant shall give upon such appeal, and that upon giving such security, the execution of the judgments entered herein in conformity with said decree be suspended and stayed until the determination of said appeal.

LUCIUS E. VARNEY,
Solicitor for Defendant.

Dated, June 3, 1921.

790

Order Allowing Appeal

At a Special Term of the District Court of the United States for the Southern District of New York held in the Post Office Building in the Borough of Manhattan of the City of New York the day of May, 1921.

Present:
Hon. John C. Knox,
United States District Judge.

791

George E. Vandenburgh,
Plaintiff,

vs.

Concrete Steel Company,
Defendant.

Concrete Steel Company, the above named defendant, having presented and filed a petition for an order allowing an appeal to the United States Circuit Court of Appeals for the Second
792 Circuit from a final decree made and entered herein in the 28th day of April, 1921, and having filed its assignment of errors with said petition, now, upon motion of Lucius E. Varney, Esq., solicitor for the defendant it is hereby

Order Allowing Appeal 793

ORDERED that an appeal to the United States Circuit Court of Appeals for the Second Circuit from the final decree made and entered herein on the 28th day of April, 1921, be, and the same hereby is allowed, and it is further

ORDERED that the amount of security required be and the same hereby is fixed in the sum of seventeen thousand four hundred thirty-five dollars and sixty-three ($17,435.63), covering the judgment of sixteen thousand five hundred thirty-four dollars and seventy-eight cents ($16,- 794
534.78) entered in favor of the plaintiff, the judgment of six hundred fifty dollars and eighty-five cents ($650.85) entered in favor of William Parkin, Master, and two hundred fifty dollars ($250.00) as security for costs on appeal; and that the plaintiff gave a bond conditioned as required by law in the sum of seventeen thousand four hundred thirty-five dollars and sixty-three cents ($17,435.63) and that upon giving such a bond the execution of the judgments entered herein be suspended and stayed until the determination of said appeal.

795

(Signed) JNO. C. KNOX,
U. S. D. J.

Dated, June 3, 1921.

796

Assignment of Errors

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant.

In Equity
No. 14-88.

797

Now comes Concrete Steel Company, defendant in the above entitled cause, in which a final decree was made and entered on the 28th day of April, 1921, and says that said decree is erroneous and against the just rights of the defendant in the following particulars:

FIRST: The District Court erred in overruling the defendant's exception No. 1 to the final report of the Master as follows:

798

1. To any award of profits in view of the Master's holding, page 4, that

"It was the duty of the plaintiff to apportion the profits between those due to the patented feature and those attributable to the unpatented part, or to show that such apportionment is impossible by reason of the defendant's acts.

> The plaintiff has made no effort to work out an apportionment or to show that one was difficult or impossible."

and

> "These estimates (of plaintiff) give no basis for an apportionment for the reason that it does not appear what if any part of this saving went to the defendant."

And in view of his further finding, page 5, that 800

> "The spirals and bars are shipped separate and assembled on the job;—field assembly it is called. Who pays the cost of this, whether the manufacturer or contractor, is not stated. * * * There is nothing to show that the defendant made any profit from saving in labor."

and

> "The plaintiff has wholly failed to sustain the burden of making such an apportionment." 801

SECOND: The District Court erred in overruling the defendant's exception No. II to the final report of the Master as follows:

> "II. To the Master's finding that (page 6)
>
> 'The evidence shows that the whole value of the defendant's structure as a

802 commercial article lay in the patented feature and that all the profits from the sale of the article were due to it.'

there being no evidence that any sale whatever, either by this defendant or by any other person, firm or corporation within the United States was effected or affected by reason of the patented combination; or that such patented combination was known to any purchaser whatever and considered by him or it
803 as a reason for making the purchase or refraining therefrom.''

THIRD: The District Court erred in overruling the defendant's exception No. III to the final report of the Master as follows:

''III. To the Master's finding that

'The difference in cost between the old method of wiring and the Vandenburgh method would be prohibitive.'

804 as without evidence to sustain it because the same is restricted to a single method of attachment and based upon evidence of so-called experts founded upon estimates and without evidence of any actual costs incurred commercially; and in view of the Master's statement, page 13, that

'There were other devices such as that involved in the Electric Welding case and

805

a method of attachment by staples clinched to the longitudinal bar, the cost of which Professor Thayer says would be about the same as the Vandenburgh method. To what extent these were used, how far they came into competition with the plaintiff's structure and what advantage the latter has or what saving or profit, over the others is not shown;'

the burden of proof as to these matters being upon the plaintiff and failure to show 806
them being a bar to any recovery whatever."

FOURTH: The District Court erred in overruling the defendant's exception No. IV to the final report of the Master as follows:

"IV. To the Master's holding, page 6, in effect that

'Only unpatented methods of attachment could be used as standards of comparison'

807

in view of the references cited in the answer and proved in the trial of the case."

FIFTH: The District Court erred in overruling the defendant's exception No. V to the final report of the Master as follows:

"V. To the Master's failure to allow the entire interest upon capital invested as an

808 offset to any profits found to have accrued, there being no authority in law for an apportionment of said interest."

SIXTH: The District Court erred in overruling the defendant's exception No. VI to the final report of the Master as follows:

"VI. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. I of the defendant submitted
809 to him before the filing of his report, as follows:

'The Master finds as a fact that plaintiff has not shown by any evidence in this case that it has suffered any damage from infringement of the letters-patent in suit by the defendant in this case.' "

SEVENTH: The District Court erred in overruling the defendant's exception No. VII to the final report of the Master as follows:

810 "VII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. II of the defendant submitted to him before the filing of his report, as follows:

'The Master finds as a fact that the plaintiff is not engaged in the manufacture and sale of the concrete reinforcing such as is described in the letters-patent in suit

and has suffered no damages by reason of any competition of the defendant in business of the character indicated.' ''

EIGHTH: The District Court erred in not sustaining the defendant's exception to the final report of the Master, No. IX, as follows:

''IX. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. IV of the defendant submitted 812
to him before the filing of his report, as follows:

'The Master finds and so reports the fact to be that the plaintiff has not shown by any competent and material evidence in this case what would be a reasonable royalty for the use of the invention described in the letters patent in suit; and that the evidence on behalf of the plaintiff is in such conflict that he is unable to determine therefrom what would be a reasonable royalty for the use of the inven- 813
tion; and that the weight of evidence, giving due regard to the qualifications and experience of the witnesses, both on behalf of the plaintiff and on behalf of the defenadnt, leaves wholly undetermined the fact that any royalty whatever would have been agreed upon and paid either by this defendant or by any other person in the trade for the use of the said

invention described in the letters patent in suit.' "

NINTH: The District Court erred in not sustaining the defendant's exception to the final report of the Master, No. X, as follows:

"X. To the Master's failure, specifically to find the conclusion of fact, set out in prayer No. V of the defendant submitted to him before the filing of his report, as fol-
815 lows:

'The Master finds and so reports the fact to be that there were other methods in use at the time of the issue of the reissued letters patent in this case which were satisfactory to the trade and accomplished the purposes of the Vandenburgh construction described in the letters patent in suit in an efficient and workmanlike manner, and that there is no advantage provided in the Vandenburgh construction over the constructions referred
816 to; and he further finds as a fact that no reason is shown by the evidence in this case why any person or persons, including the defendant in this case, should pay any royalty whatever for the use of the Vandenburgh construction.' "

TENTH: The District Court erred in not sustaining the defendant's exception No. XI to the final report of the Master, as follows:

"XI. To the Master's failure specifically to find the conclusion of law, set out in prayer No. VI of the defendant submitted to him before the filing of his report, as follows:

"The Master finds, as a conclusion of law from all the competent and material evidence in the case on the question of damages, that plaintiff is entitled to nominal damages of six cents, and no more; under the rules of law laid down by the Supreme Court of the United States in the following cases: 818

Garretson v. Clark, 111 U. S. 121;

and by the Circuit Court of Appeals for the Second Circuit in

Tuttle v. *Gaylord*, 28 F. R. 97;

Hohorst Case, 91 F. R. 655.' "

ELEVENTH: The District Court erred in not sustaining the defendant's exception No. XII to the final report of the Master, as follows:

"XII. To the Master's failure, specifically to find the conclusion of fact, set out in prayer No. VII of the defendant submitted 819 to him before the filing of his report, as follows:

'The Master finds as a fact that there were concrete reinforcements in use in the trade other than in the form shown by the plaintiff which were capable of efficient use and which were in fact so used

820 satisfactorily; and that there is no competent and material evidence in the case showing any financial advantage to the defendant from the use of the infringing concrete reinforcements over such other concrete reinforcement. Specifically the Master finds and so reports the fact to be that the forms of concrete reinforcements designated briefly as the Third Circuit forms, which were referred to by the Court of Appeals for the Third Circuit in the

821 case of

Vandenburgh v. Electric Welding Co., 263 F. R. 95;

and particularly described by the Court of Appeals on Page 97 beginning at line 20, and ending at line 43 were practical and reliable forms of concrete reinforcement and are held by the Court not to infringe the letters patent in suit, and that there is no competent and material evidence in

822 the case of any advantage whatever of the plaintiff's patented structure over the form of concrete reinforcing described by the Court as above noted, which said form of concrete reinforcement was open to the defendant in this case to make, use and sell.

Other forms of concrete reinforcement, particularly the types known as wired reinforcements, were stated by the plain-

tiff's witnesses to be outside of the patent in suit and the Master finds the fact so to be and he further finds that there is no competent and material evidence in the case of any financial advantage from the use of the construction shown in the patent in suit over such other forms of concrete reinforcement.' "

TWELFTH: The District Court erred in not sustaining the defendant's exception No. XIII to the final report of the Master as follows: 824

"XIII. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. VIII of the defendant submitted to him before the filing of his report, as follows:

'The Master finds and so reports the fact to be that there is no competent and material evidence in the case that the sale of the concrete reinforcements by the defendant was effected or affected by reason of the so-called Vandenburgh combination 825 disclosed in the patent in suit.

Specifically the Master finds and so reports the fact that the sales were merely an incidental and relatively insignificant part of the total sales of the defendant, and that such sales were made in general in connection with sales of other and more important items and as an accommodation to purchasers of larger and more impor-

826 tant items who desired to fill all their wants from a single source.' "

THIRTEENTH: The District Court erred in not sustaining the defendant's exception No. XIV to the final report of the Master, as follows:

"XIV. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. IX of the defendant submitted to him before the filing of his report, as fol-
827 lows:

'The Master finds and so reports the fact to be that the plaintiff has given no evidence showing any apportionment of total profit of the defendant in the sale of the iron work referred to in their report entitled 'Plaintiff's Accounting Exhibit 4' between the ordinary manufacturer's profit from the sale of iron work, and those due to the use of the invention of the patent in suit.' "

828 FOURTEENTH: The District Court erred in not sustaining the defendant's exception No. XV to the final report of the Master, as follows:

"XV. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. X of the defendant submitted to him before the filing of his report, as follows:

829

'The Master finds as a fact that the plaintiff has given no evidence showing that an apportionment of profits in the way indicated in Prayer IX is impossible either by reason of expense or difficulty, and as a conclusion of law thereon he reports that the defendant was under no duty to attempt to apportion profits.''

FIFTEENTH: The District Court erred in not sustaining the defendant's exception No. XVI to the final report of the Master, as follows:

830

"XVI. To the Master's failure specifically to find the conclusion of fact, set out in prayer No. XI of the defendant submitted to him before the filing of his report, as follows:

'The Master finds on all the competent and material evidence in the case that no basis for apportioning profits between sales of iron work in general and profits due to the use of the invention of the patent in suit has been laid.'"

831

SIXTEENTH: The District Court erred in not sustaining the defendant's exception No. XVII to the final report of the Master, as follows:

"XVII. To the Master's failure specifically to find the conclusion of law, set out

in prayer No. XII of the defendant, submitted to him before the filing of his report, as follows:

'The Master finds, as conclusion of law from the evidence, that plaintiff is not entitled to any sum by way of recovery of profits from the defendant in this case earned by it from the practice of the invention set out in the claims in suit; under the rules of law laid down by the Supreme
883 court of the United States in

Dobson v. *Hartford Carpet Co.*, 114 U. S. 439;
Dobson v. Dornan, 118 U. S. 10;
Mowry v. *Whitney*, 81 U. S. 620;
Black v. *Thorne*, 111 U. S. 121;
Garretson v. *Clark*, 111 U. S. 122;
Coupe v. *Royer*, 155 U. S. 565;
Rude v. *Westcott*, 130 U. S. 152;
Spaulding v. *Mason*, 161 U. S. 375;

834 And in the Courts of this Circuit in
Tuttle v. *Gaylord*, 28 F. R. 97;
Hohorst Case, 91 F. R. 655;
Roemer v. *Simon* 31, F. R. 41.'"

SEVENTEENTH: The District Court erred in not sustaining the defendant's exception No. XVIII to the final report of the Master, as follows:

"XVIII. To the Master's failure specifically to find the conclusion of fact and law, set out in prayer No. XIII of the defendant submitted to him before the filing of his report as follows:

'The Master finds as conclusion of fact and law from all the competent and material evidence in the record of the whole case; that plaintiff is entitled to a decree of six cents damages, no profits, and its costs up to and including the interlocutory 836
decree; and that defendants are entitled to the costs of the accounting; under the rule of law laid down by the Supreme Court of the United States.'"

EIGHTEENTH: The District Court erred in ordering that the plaintiff recover profits in the sum of $15,918.33 with interest from the date of the Master's report, to wit, November 15, 1920.

NINETEENTH: The District Court erred in ordering that the defendant be taxed $500.00 for the Master's fee and $150.85 for his stenogra- 837
pher's fee.

TWENTIETH: The District Court erred in ordering that the plaintiff recover from the defendant its costs to be taxed including the costs of all stenographer's minutes paid by him, both in court and before the Master and also his costs in

838 *Assignment of Errors.*

the Circuit Court of Appeals in the sum of $78.48.

CONCRETE STEEL COMPANY,
By LUCIUS E. VARNEY,
Solicitor and of Counsel.

EMERY, VARNEY, BLAIR & HOGUET,
T. J. JOHNSTON,
L. E. VARNEY,
Of Counsel.

839

841

Citation

By the Honorable JOHN C. KNOX, one of the Judges of the District Court of the United States for the Southern District of New York, in the Second Circuit.

To GEORGE E. VANDENBURGH,

GREETING

YOU ARE HEREBY CITED and admonished to be and appear before a United States Circuit Court 842
of Appeals for the Second Circuit, to be holden at the Borough of Manhattan in the City of New York, in the District and Circuit above named, on the 5th day of July, 1921, pursuant to an appeal filed in the Clerk's Office of the District Court of the United States for the Southern District of New York, wherein Concrete Steel Company is the appellant and you are the appellee to show cause, if any there be, why the decree in said appeal mentioned should not be corrected and speedy justice should not be done in that behalf.

843

Given under my hand at the Borough of Manhattan, in the City of New York, in the District and Circuit above named, this 3rd day of June, in the year of our Lord One Thousand Nine Hundred and Twenty-

one, and of the Independence of the United states the One Hundred and Forty-fifth.

JNO. C. KNOX,
Judge of the District Court of the United States for the Southern District of New York, in the Second Circuit.

847

Stipulation Re Contents of Record

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBURGH,
Plaintiff,
vs.
CONCRETE STEEL COMPANY,
Defendant.
} In Equity

848

IT IS STIPULATED AND AGREED by and between counsel:

I. That the parties shall print a joint record, one-half of the cost of printing to be advanced by the defendant and one-half by the complainant, to be taxed as the Court may direct.

II. That the record on the former appeal to the Circuit Court of Appeals, the Court consenting thereto, shall be used as a physical exhibit, and either party may refer thereto with 849 the same force and effect as if printed as part of this record.

III. That the Clerk shall include the following matters in the Transcript of Record in this case, for the Circuit Court of Appeals:

850 *Stipulation Re Contents of Record.*

(a) The order of the District Court entered upon the mandate of the Circuit Court of Appeals, referring the cause to a Master.

(b) The Master's *praecipe*.

(c) The proceedings before the Master, including the testimony and paper exhibits.

(d) The requests for findings by the plaintiff, if any.

851

(e) The requests for findings by the defendant.

(f) The Master's final report.

(g) The exceptions by the plaintiff to the Master's final report.

(h) The exceptions by the defendant to the Master's final report.

852 (i) The opinion of his Honor Judge Knox in the District Court, passing upon the Master's report.

(j) The order entered upon the decision of the District Court.

(k) The appeal papers, including

(1) The petition for appeal of the plaintiff.

(2) The order allowing the appeal of the plaintiff.

(3) The assignment of errors of the plaintiff.

(4) The citation of the plaintiff.

(5) The petition for appeal of the defendant.

(6) The order allowing the appeal of the defendant.

(7) The assignment of errors by the defendant. 854

(8) The citation of the defendant.

(9) This stipulation.

(10) The stipulation of completeness of the Transcript.

(11) The Clerk's Certificate.

IV. It is further stipulated that the bonds need not be printed in the record.

855

O. ELLERY EDWARDS,
Solicitor for Plaintiff.

EMERY, VARNEY, BLAIR & HOGUET,
Solicitors for Defendant.

So ordered:

H. G. WARD,
United States Circuit Judge.

New York, June 21, 1921.

856

Stipulation

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

GEORGE E. VANDENBNRGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee,

857

It is hereby stipulated and agreed, that the foregoing is a true transcript of the record of the said District Court in the above-entitled matter as agreed on by the parties.

Dated, August 7th, 1921.

O. ELLERY EDWARDS,
Attorney for Plaintiff.

EMERY, VARNEY, BLAIR & HOGUET,
Attorneys for Defendant.

858

Clerk's Certificate

859

United States of America,
Southern District of New York, } ss:

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,
vs.
CONCRETE STEEL COMPANY,
Defendant-Appellee,

I, ALEXANDER GILCHRIST, JR., Clerk of the District Court of the United States of America for the Southern District of New York, do hereby Certify that the foregoing is a correct transcript of the record of the said District Court in the above-entitled matter as agreed on by the parties. 860

In testimony whereof, I have caused the seal of the said Court to be hereunto affixed, at the City of New York, in the Southern District of New York, this 7th day of August, in the year of our Lord one thousand nine hundred and twenty-one and of the Independence of the said United States the one hundred and forty-sixth. 861

ALEX. GILCHRIST, JR.,
Clerk.

(Seal)

UNITED STATES OF AMERICA,
Southern District of New York, ss:

I, William Parkin, Clerk of the United States Circuit Court of Appeals for the Second Circuit, do hereby Certify that the foregoing pages, numbered from 1 to 287 inclusive, contain a true and complete transcript of the record on appeal to said Court, in the case of George E. Vandenburg against Concrete Steel Company as the same remain of record and on file in my office.

In testimony whereof, I have caused the seal of the said Court to be hereunto affixed, at the City of New York, in the Southern District of New York, in the Second Circuit, this 31st day of December in the year of our Lord One Thousand Nine Hundred and twenty-one and of the Independence of the said United States the One Hundred and forty-sixth.

[Seal of the United States Circuit Court of Appeals, Second Circuit.]

WM. PARKIN,
Clerk.

UNITED STATES OF AMERICA, *ss:*

[Seal of the Supreme Court of the United States.]

The President of the United States of America to the Honorable the Judges of the United States Circuit Court of Appeals for the Second Circuit, Greeting:

Being informed that there is now pending before you a suit in which George E. Vandenburgh is appellant, and Concrete Steel Company is appellee, No. 172, October Term, 1918, which suit was removed into the said Circuit Court of Appeals by virtue of an appeal from the District Court of the United States for the Southern District of New York, and we, being willing for certain reasons that the said cause and the record and proceedings therein should be certified by the said Circuit Court of Appeals and removed into the Supreme Court of the United States, Do hereby command you that you send without delay to the said Supreme Court, as aforesaid, the record and proceedings in said cause, so that the said Supreme Court may act thereon as of right and according to law ought to be done.

Witness the Honorable William H. Taft, Chief Justice of the United States, the second day of February, in the year of our Lord one thousand nine hundred and twenty-two.

WM. R. STANSBURY,
Clerk of the Supreme Court of the United States.

[Endorsed:] File No. 28629. Supreme Court of the United States, October Term, 1921. No. 674. Concrete Steel Company vs. George E. Vandenburgh. Writ of Certiorari. United States Circuit Court of Appeals, Second Circuit. Filed Feb. 3, 1922. William Parkin, Clerk.

Certiorari from the Supreme Court of the United States to the Circuit Court of Appeals for the Second Circuit.

October Term, 1921.

No. 674.

CONCRETE STEEL COMPANY, Petitioner,

v.

GEORGE E. VANDENBURGH, Respondent.

Stipulation.

In the matter of the return to the writ of certiorari in the above entitled case, it is

Stipulated and agreed by and between counsel for the respective parties that the certified transcript of record heretofore filed with the Court upon the application for the writ shall be taken to be the return of the Circuit Court of Appeals thereto and that no other return need be filed; the Court consenting thereto.

THOMAS J. JOHNSTON,
Counsel for Petitioner.

O. ELLERY EDWARDS,
Counsel for Respondent.

February 3, 1922.

[Endorsed:] Certiorari from the Supreme Court of the U. S. to the Circuit Court of Appeals for the Second Circuit. Concrete Steel Company, Petitioner, v. George E. Vandenburgh, Respondent. No. 674. October Term, 1921. Stipulation. Emery, Varney, Blair & Hoguet, 149 Broadway, New York.

To the Honorable the Supreme Court of the United States, Greeting:

The record and all proceedings whereof mention is within made having lately been certified and filed in the office of the clerk of the Supreme Court of the United States, a copy of the stipulation of counsel is hereto annexed and certified as a return to the writ of certiorari issued herein.

Dated, New York, February 3, 1922.

[Seal of the United States Circuit Court of Appeals, Second Circuit.]

WM. PARKIN,
Clerk of the United States Circuit Court of Appeals for the Second Circuit.

[Endorsed:] United States Circuit Court of Appeals, Second Circuit. George E. Vandenburgh v. Concrete Steel Co. Return to Certiorari. 1.70. Sup. Ct. No. 674.

[Endorsed:] File No. 28629. Supreme Court U. S., October Term, 1921. Term No. 674. Concrete Steel Co., Petitioner, vs. George E. Vandenburgh. Writ of certiorari and return. Filed Feb. 11, 1922.

In the Supreme Court of the United States, October Term, 1921.

No. 674.

CONCRETE STEEL COMPANY, Petitioner,

v.

GEORGE E. VANDENBURGH, Respondent.

On Certiorari to the Circuit Court of Appeals for the Second Circuit.

Stipulation.

The Court consenting thereto, it is stipulated and agreed by and between counsel that as the figures have been correctly summarized in the Master's Report, the columns of figures marked "Plaintiff's Exhibits 2, 3 and 4" and found in the Transcript of Record upon the second appeal to the Circuit Court of Appeals in this case, beginning on page 149 and ending at page 200, may be omitted from the printed record to be used in this Court upon the argument of the return to the writ of certiorari; and the Clerk is directed to omit the same.

THOMAS J. JOHNSTON,
Counsel for Concrete Steel Company, Petitioner.
O. ELLERY EDWARDS,

Dated March 14, 1922, New York City, N. Y.

Counsel for George E. Vandenburgh, Respondent.

[Endorsed:] 674—28629. In the Supreme Court of the United States. Concrete Steel Company, Petitioner, v. George E. Vandenburgh, Respondent. No. 674. Stipulation. Emery, Varney, Blair & Hoguet, 149 Broadway, New York.

[Endorsed:] File No. 28,629. Supreme Court U. S., October Term, 1921. Term No. 674. Concrete Steel Co., Petitioner, vs. Geo. E. Vandenburgh. Stipulation to omit parts of record in printing. Filed Mar. 15, 1922.

IN THE

SUPREME COURT OF THE UNITED STATES.

October Term, 1921.

CONCRETE STEEL COMPANY, Petitioner, v. GEORGE E. VANDENBURGH,	No. 674.

Stipulation.

The Court consenting thereto, it is Stipulated and Agreed that a certified copy of the final or second opinion of the Circuit Court of Appeals in this case, prepared by his Honor Judge Mayer, shall be filed in the office of the Clerk and printed copies thereof attached to the Transcript of Record in this case with the same force and effect as if the opinion had formed part of the original Transcript.

THOMAS J. JOHNSTON,
Counsel for Concrete Steel Company,
Petitioner.

O. ELLERY EDWARDS,
Counsel for George E. Vandenburgh.

Dated, New York, N. Y.,
September 25, 1922.

Opinion.

UNITED STATES CIRCUIT COURT OF APPEALS,

FOR THE SECOND CIRCUIT.

No. 120—October Term, 1921.

Argued November 17, 1921.
Decided December 14, 1921.

GEORGE E. VANDENBURGH,
Plaintiff-Appellant,

v.

CONCRETE STEEL COMPANY,
Defendant-Appellee.

Before: ROGERS, MANTON and MAYER,
Circuit Judges.

Appeals from the District Court of the United States for the Southern District of New York.

Carlos P. Griffin and *O. Ellery Edwards*, for Plaintiff.

Lucius E. Varney, Thomas J. Johnston and *Manvel Whittemore*, for Defendant.

Opinion.

Appeal from final decree of the District Court of the Southern District of New York in favor of plaintiff. Both parties appeal.

MAYER, *Circuit Judge*:

This is the ordinary patent infringement suit which now comes here on appeal from a final decree adjudging that plaintiff recover from defendant profits in the sum of $15,918.33 with interest from the date of the Master's report.

Originally, the District Court dismissed the bill for non-infringement but the decree was reversed for the reasons stated in 258 F. R. 143.

Thereafter, in due course, the usual interlocutory decree was entered, *inter alia*, referring the accounting to a Special Master. The Special Master reported that plaintiff was entitled to recover profits but not damages. The District Court sustained this report. Both the District Judge and the Master wrote opinions fully and carefully discussing the questions involved.

1. The patent has been considered by several courts, *Vandenburgh* v. *Electric Welding Company*, 259 F. R. 579, 263 F. R. 95; certiorari denied 253 U. S. 497; *Vandenburgh* v. *Truscon Steel Company* opinion of District Court for the Northern District of Ohio, Eastern Division dated September 23, 1920; and there have been differences of opinion.

The law of this case, however, is that set forth in this court's opinion per Judge Ward in 258 F. R. *supra*. The gist of the case may be recalled by the following quotation.

"These claims * * * (3 and 5 of the reissue) * * * should be construed consistently with the specifications, which are also literally the same in each patent, as meaning that the spiral coil is rigidly connected with the longitudinal bar at each point of contact. So construed the claim describes a continuous spiral rigidly and integrally connected with kerfs and spurs in the bar constituting a trusslike structure within the body of the concrete resisting lateral and longitudinal strains and which can be more cheaply manufactured than if the spiral were riveted or welded to the bar at each point of contact.

The defendant's witness Cummings frankly admits that this form of reinforcing structure was new in cement work and has come into general use. * * * The defendant's structure when set up to receive the concrete is exactly the same as plaintiff's except that the spiral coil is not rigidly fixed by kerfs and spurs on the bar. This enables the structure to be collapsed when not in use, a commercial improvement for purposes of shipment but which does not justify the defendant's appropriation of the plaintiff's structure."

Defendant's collapsible feature thus did not avoid infringement but merely added a commercial improvement for purposes of shipment.

It is contended by defendant that the case is one for apportionment of profits and that Court and Master erred when they ascribed (as did plaintiff) the whole value of defendant's struc-

ture as a commercial article to the Vandenburgh patent feature.

The theory of defendant is that all or, in any event, part of the commercial value of defendant's structure was due to its collapsible feature and, but for this, the structure would not have have been saleable. Therefore, defendant contends that when plaintiff has not adduced any testimony that the structure is salable when not collapsible or of the profits due to collapsibility, plaintiff has failed to carry the burden of proof cast upon him. *Westinghouse* v. *Wagner Mfg. Co.*, 225 U. S. 604.

Defendant did not introduce any testimony in respect of apportionment. It relied on its contention that because plaintiff failed to produce testimony upon which an apportionment could be based, he would be entitled to nominal damages only.

It may be assumed from the testimony of plaintiff's witnesses that if the structure were shipped there would be a saving in freight. It may, also, be assumed that in some instances, owing to competitive conditions, the determining factor in a sale might be this saving. Yet, it is entirely plain that there never would have been any sale whatever without this Vandenburgh feature. It was the Vandenburgh "form of reinforcing structure" infringed by defendant, which was new in the art. The advantage according to the expert Thayer, over the method, in the prior art, of riveting or wiring is that "the method of wiring uses up a good deal of the section of the bar. It was wasted that way and riveting is also expensive."

Thayer also mentioned the collapsible feature as a part of what he called the "Vandenburgh method" but, with this, we do not agree, in view of our former decision.

It is entirely clear, however, that defendant would never have sold a dollar's worth of its devices had it not availed of plaintiff's patent. The cheapness of manufacture was due to plaintiff's disclosure, which, therefore, created defendant's device as a commercial commodity. Because, then, in some instances, the additional feature of collapsibility saved freight, it cannot be said that this feature placed the burden of showing apportionment on plaintiff.

The test is whether the invention of the patent gives the whole value to the infringing device. Obviously, it must, in a case where the sale of the article would be impossible without availing of the disclosure of the patent and, where the additional feature had no relation to the structure, *qua* structure, or to its shipment as such but only to reduce expense in transportation, accomplished by means which in no manner changed the character of the structure when used for the purposes for which it was designed.

If, therefore, the saving of freight was an accounting element, the burden of so showing was on defendant.

Westinghouse v. *Wagner Mfg. Co.*, *supra.*

This is pecularily illustrated in this case.

Barbour, who is in charge of the details of the sales in defendant's New York office was called by plaintiff. He testified as follows:

> "Q41. In any event, these spirals are shipped collapsed, connected to some longitudinal bars, you understand that to be the subject matter of this suit? A. I understand that to be the subject matter of this suit, but the spirals are not all shipped in that way, not in my territory.
>
> Q42. What percentage are shipped in any other way? A. You mean the territory I know about, that is within New York City or a radius of 25 miles of New York City?
>
> Q43. Where you are selling? A. In New York City or a radius of 25 miles from New York, they ship what we call field assembled; that is, the coil wire is shipped, it is coiled to diameter and shipped separate as a coil, then the angles are punched and shipped separate, that is on account of a restriction.
>
> Q44. Assembled by you or assembled by the contractor? A. By the contractor on the job, what we call field assembly; that is an account of a restriction, I think it is, Metal Lathers Union; they won't allow us—they won't allow I don't know as I should say 'us', but they won't allow the contractors to use spiral in any other way in New York City or within a radius of 25 miles of New York."

The foregoing shows that a considerable business was done by defendant without the collap-

sible feature because of the "Union" restriction and, thus, destroys any contention that collapsibility was, in all instances, an indispensible requisite.

From what has been said *supra,* there was no obligation upon plaintiff to apportion the profits between the Vandenburgh features and the prior art. There was no standard of comparison and, on the evidence in this case, there was no occasion for that reason to apportion profits. See *Philadelphia Rubber Works Co.* v. *U. S. Rubber Reclaiming Works,* F. R. , recently decided by this court.

2. On the facts in the case as clearly set forth by the master and approved by Judge Knox, there was no evidence which afforded any basis for fixing the amount of a reasonable royalty. We think this question was wholly one of fact to be disposed of on settled principles which do not call for exposition.

3. Plaintiff urges that he is entitled to recover interest at six per cent. as to each item of profit from the date thereof as set forth in defendant's account. There is no evidence of wanton infringement. The mere fact that the courts held different views as to the claims of the patent is sufficient to negative any such suggestion.

Metallic Rubber Tire Company v. *Hartford Rubber Works Company,* F. R.
The Philadelphia Rubber Works Co. v. *U. S. Rubber Reclaiming Works, et al.*

In an infringment case, where there is a genuine controversy, it is settled in this circuit, that interest runs from the filing date of the Master's report.

Oehring against *Fox Typewriting Co.*, 251 F. R., 584;
Metallic Rubber Tire Co. v. *Hartford Rubber Works Company, supra.*
The Philadelphia Rubber Works Co. v. *U. S. Rubber Reclaiming Works, et al., supra.*

4. Plaintiff, contrary to defendant's contention was not guilty of laches and there were no intervening rights. Plaintiff has recovered profits only from August 15, 1916, the date of the reissue patent.

The decree is affirmed without costs on this appeal.

In view of the result, there is no occasion to deal further with the Master's motion to dismiss or affirm as to his allowance.

A true copy.

WM. PARKIN,
Clerk.

(Seal)